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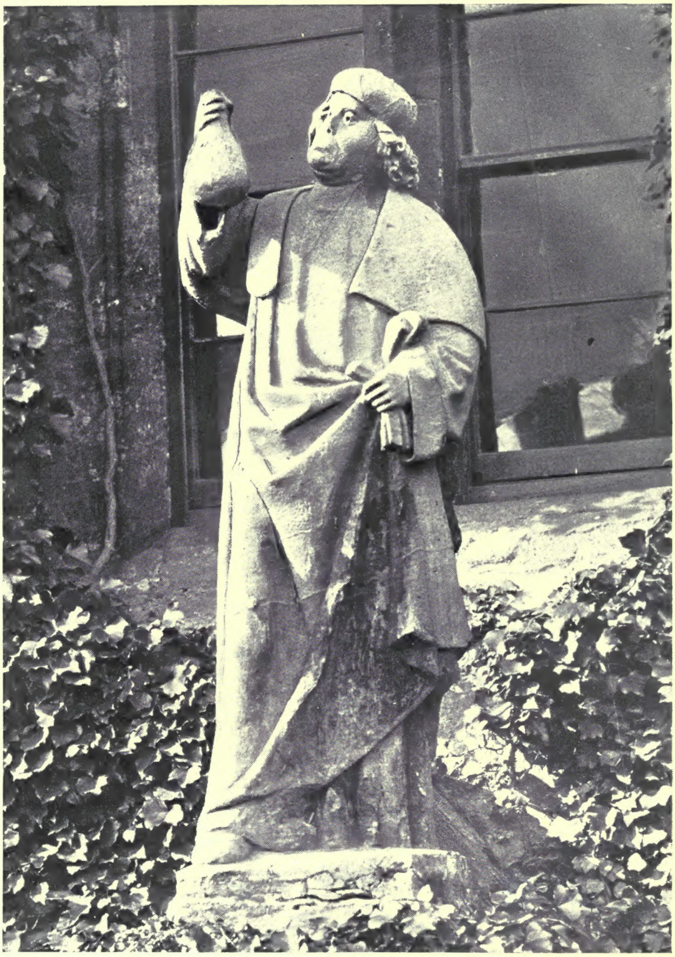

A DOCTOR OF MEDICINE

MAGDALEN COLLEGE, 1508

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The
Daubeny Laboratory Register
1904—1915

With notes on the teaching of Natural Philosophy
and with lists of Scientific Researches carried out
by Members of Magdalen College, Oxford

obert heodore
By R. T. Günther, M.A., F.L.S.

Fellow and Tutor of Magdalen College

> Me thinketh it acordant to resoun,
> To telle yow alle the condicioun
> Of eche of hem, so as it semed me,
> And which they weren, and of what degre;
> And eek in what array that they were inne.
>
> CHAUCER.

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PREFACE

THESE lists and bibliographies of Members of Magdalen College who have contributed to the advancement of some branch of Natural Science or who have attended courses of instruction in the College laboratory, were compiled before the outbreak of war as a supplement to the Register, printed in 1904 as Appendix E to the *History of the Daubeny Laboratory*. They are a record of ten years of quiet achievement by those who have been trained in the Science Schools of Oxford.

Some historical and biographical notes on those who are no longer with us, but to whom much of the success of the laboratory has been due, had also been prepared, but with other historical matter are now omitted. The chapters may therefore appear somewhat disconnected. We hope yet, after the war, to pay this tribute to the memory of our friend and predecessor Edward Chapman, and to that of Yule, Payne, Hopkins, Burdon-Sanderson, and others.

In the earlier part of the Register of Members of the University who have worked in the Daubeny Laboratory, places in the class-lists of the Honour School of Natural Science, and professional appointments were quoted as indications of relative success. There is, however, a tendency in academic circles to overrate the value of such data, and a wider knowledge of the world shows us that the ultimate success of students is not to be estimated by the awards of examiners. Published works afford a surer measure of a man's capacity to contribute to the advancement of knowledge, but we are aware that even this criterion may fail: Dr. Edmund Cartwright, the greatest inventive genius connected with Magdalen, wrote little, and his writings were trivial when compared with his contrivances.

To make our record therefore more complete than was the earlier one, we have appended bibliographies to the names in the Register; and to compare the achievements in Natural Science of the earlier members of the College with those of the post-Daubenian period, we have added a list of their scientific writings. This, though doubtless not complete, shows how recently it is that Magdalen men have turned their attention to the Philosophy of Nature. We see that only sixteen scientific treatises appeared before the nineteenth century. Wotton, 1552, the first on the list, was evidently one of the last of the great Schoolmen. Gowin Knight and Cartwright were the only two authors who became Fellows of the Royal Society before Daubeny; whereas many of Daubeny's pupils received this honour.

But it is only since Demyships and Exhibitions have been awarded for Natural Science (less than fifty years ago), and after Edward Chapman had been appointed lecturer, that the success of Magdalen as a science College may be said to have begun.

The classes in the Schools obtained by Demies, Exhibitioners, and Commoners admit of being tabulated, and thus of being compared with results in other Colleges.

The following conditions have been found to make for the success of a science school.

1. Scholarships. If awards be made after examination, the best results are obtained by holding the examination at a season when the best candidates are likely to enter, and before they have made arrangements to go elsewhere.

2. The College tutorial system has been most successful in colleges in which tutors in Natural Science have the advantage of a college laboratory. Apparatus and collections are as essential to tuition in science as books in classics, or as sand, blackboard, or paper for tuition in mathematics.

3. Personal intercourse with the professors. Frequent visits by the professor have a stimulating influence on the students in his laboratory. Prof. J. J. Thomson's success has been largely due to this, and to 'Laboratory Teas', at which students discuss their problems *sine ulla solennitate*. As a student I derived much benefit from Seminars.

4. Possibility of residing near their Colleges for science

tutors who believe that the efficiency of their work is impaired if they live at a distance.

If a proposal were made to tutors resident in College that they should take their pupils in a room a mile away from their own studies, they would answer that for efficient teaching they must be surrounded by their books; that these cannot be in two places at once; that a room only used for seeing men is apt to become a mere office; that the touch between tutor and pupil that contributes to make a valuable and distinctive feature of Oxford life would be lost, as well might they be at one of the new universities.

For original workers, residence at a distance means that in ninety-nine cases out of a 100, researches requiring continuous attention are simply not undertaken.[1]

5. Facilities for travel and for work at other centres. More frequent intercourse between Oxford, Cambridge, and London would be advantageous. There are many subjects that cannot be studied at all except during certain seasons: it is undesirable that the necessity of keeping Terms during the whole of his young working life should debar an investigator from ever once gaining first-hand information on such subjects.

6. Research in actual progress in a laboratory has a most stimulating influence on other workers, even though they be only reading for examinations.

7. A fund for the encouragement of useful and successful research from which a proportion of the incidental expenses for materials may be defrayed.

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[1] Some of the advantages of near residence were outlined by * * in the *Oxford Magazine* for March 6, 1901. Dr. Daubeny built a house at his own expense that he might live next his laboratory, and Edward Chapman, feeling the disadvantage of living at the other end of the town left Frewen Hall and rented Magdalen Gate House, to the great benefit of both senior and junior members of his College. Magdalen will not easily find a successor able and willing, for an ideal in efficiency, to make a monetary sacrifice equivalent to the value of his Fellowship. No one is more fully conscious than the present Science tutor of the daily waste of time, of energy and efficiency incurred in living at a distance; and in his own particular case it has involved the practical scrapping of a unique educational plant. Few scientific teachers have been more successful than Dr. Buckland: he was inseparable from his specimens.

The administration of such funds would need the strictest supervision. It has happened only too often that those who clamour the loudest (or the most diplomatically) have received the lion's share. And we well know that without due control

> Science's ravenous maw (like an ogress's)
> Takes what we give her and clamours for more.

Waste is not unknown in hospital or in laboratory administration.

8. Adequate stipends for Science Tutors (and Science Masters in Schools). Expense in literary work begins and ends with the acquisition of books, and research consists in reading them. Classical authors and philosophical books are for the most part cheap. The Science man has greater expenses at every stage of his career. Training, books, instruments, materials are a perennial charge, and 'economy' in them too often means failure to keep abreast of scientific progress. Towards the end of his life Daubeny estimated the value of his plant for teaching and research at £3,000: my own is insured at half that amount. In some professions interest is expected upon capital outlay. More equitable treatment would undoubtedly result in an increase in the number of men who are able to take up scientific work, to the benefit of the country.

9. Emancipation of scientific affairs from the control of the classical element in the Colleges.[1] On at least one governing body in Oxford the classical majority has a predominant voting power of eight to one on matters essentially affecting the welfare of Natural Science. Voting by faculties would be more fair.

10. Recognition of the value of the study of the History of Science, and the appointment of special Curators for the Science collections. In several branches of Science the historical aspect is almost entirely ignored, Medicine being a notable exception. Such historical study would be greatly aided by the formation of suitable collections.

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[1] Every commander of an Army Corps must have authority over all its business 'without War Office interference in details'. (Prof. Spenser Wilkinson's *Way to Victory*. 26 Feb., 1916.)

The aims of Museums and Laboratories differ widely. Laboratories should always be abreast of the times. A Museum represents the past, its *locus standi* is to deal with what is out-of-date. It has many functions, a minor one being to record the history of research in laboratories, and it should not be continually refashioning itself to take their place.

The older scientific members of the College may feel a collective pride and an incentive in the fact that in the short space of the last ten years more contributions to true scientific learning have been made by them than by all their predecessors since the foundation of the College. Many of our graduates are now doing expert work in connexion with munitions of war. The practical study of Physical Chemistry, introduced into Oxford in the Daubeny Laboratory, has become an increasingly important branch of study and is now to have a special professorship. Research, on which we have so long insisted, is at last to be made an integral part of the Chemical School. There are many branches of science in which pioneer work may yet be done in college laboratories. That is their justification. Experience shows that work done in private laboratories to-day will be done in those of the University to-morrow.

One other matter should be mentioned. The practice of the present science tutor at Magdalen has differed from that of his contemporaries at other Colleges in that he has endeavoured to give instruction in the elements of all the sciences recognized by the Natural Science Board, viz. Physics, Chemistry, Zoology, Physiology, Botany, Geology. The days have long gone past when any one person could undertake the whole instruction for the Honours School in even one of these subjects; for this recourse must always be had to specialist-tutors. But there are very great advantages in a science tutor of a relatively small number of men (never exceeding one-seventh of the undergraduates in residence in his College) becoming personally acquainted with the work of all his men while they are still reading for their preliminary examinations. Though this diffusing of work has hindered concentration on special research, economically it has resulted in a considerable saving of fees either to the Tuition Fund or to the pupils. Naturally a Chemistry tutor with many pupils could not have done it; it was only possible for a biological tutor with but few pupils reading for his special school.

This has been the policy at Magdalen for two generations of tutors. There have been failures as well as successes: the results are now open to criticism.

I feel sure that all the Scientific Members of the College will join me in expressing warm thanks to the special tutors who have superintended their work for the Final Honour Schools. We must specially mention Drs. Watts, Vernon, Church, Messrs. Wilson, Sidgwick, and Moore, and the present Daubeny Curator, Mr. J. J. Manley, whose teaching, patience, and wonderful manipulative skill are gratefully remembered by many generations of science men.

The President of Magdalen, though first and foremost a lover of Poetry and the Classics, has always been ready to encourage the scientific element in the College.

Also my classical colleagues on the Tutorial Board must be thanked for their kind consideration of the claims of Natural Science: had they been able to go a step further and give active support to oft-repeated proposals concerning science scholarship examinations the College would now have bettered its present record of usefulness in war-service. It is a matter for regret that while Magdalen has done so much to encourage the study of Natural Science, a majority of the classical vote in the University, on the pretext of trying an experiment in education, should in 1900 have sapped our supply of science students. Swayed by an agitation engineered at Schoolmasters' conferences, the classical majority assented to an alteration in the date of examination for science scholarships, of which the ultimate result has been that Cambridge already in a strong position for the selection of Scholars has been given an overwhelming advantage. In short, Natural Science in Oxford was made a pawn in the game and was sacrificed to the supposed interests of classics. Magdalen in the interests of Oxford should have stood out against the innovation; classical studies in the University are said not to have benefited by it; that science has lost is incontrovertible, for the effect has been to reduce the number of the best type of scholars reading Natural Science.

Taking two periods of twelve years before and after 1900, in the medical school, the men reading for honours in Physiology in Magdalen were:

	Before 1900	After 1900
Demies and exhibitioners	8	2
Commoners	18	5

In Zoology three demies have been elected before, only one after 1900.

In Chemistry the falling off in numbers is less marked, but the quality of the work of candidates sent up by the schools for scholarships has often been so poor that Colleges have been unable to elect, and from this the candidates' parents might reasonably infer that the energy expended at the schoolmasters' conferences would be more profitably employed in brushing up the teaching at the schools.

It is not only from the narrow standpoint of University politics that we are deploring the close-time agreement: more, alas, is involved. The shortage of science candidates in the last twelve years is telling on us now, an early death has bereft us lately of some of our best scientific workers, the war is robbing us of many more; the country now needs all the scientific assistance it can obtain, and Oxford has insufficient reserves for making these losses good.

But for the outbreak of war the publication of this report would have taken place in 1915. An indefinite postponement seemed at first the only course to pursue: on second thoughts however, the necessity for inventories setting out the intellectual assets of the nation seemed to make the preparation of such lists a national duty, and we have proceeded.

The flower of our manhood and youth have been allowed hitherto to form a rampart for slackers and shirkers. The suddenness of the emergency gave our lawyer-politicians the semblance of an excuse for a want of prevision that is now costing the country the best of one generation: with lists such as this to hand, they would have less excuse for heedless procedure. If as a result a few of the burdens of war are adjusted with an intelligent appreciation as to the parts that men of conspicuous ability and special training are best fitted to perform, the work of compilation will be amply repaid.

R. T. GÜNTHER.

March 1916.

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The pagination of this volume continues that of the HISTORY, *to facilitate the construction of a combined index to both parts of the Register.*

CORRIGENDA TO THE *HISTORY OF THE DAUBENY LABORATORY*

p. 3 lines 5 and 24 for 1622 read 1621

p. 5 line 1 for *Sibthorp* read *Sibthorp's successor, Williams*

  „ 23 for *death of Dr. Daubeny* read *resignation of Prof. Lawson in 1882*

p. 62 line 29 for *Industry* read *Husbandry*

Old events have modern meanings; only that survives
Of past history which finds kindred in all hearts and lives.
LOWELL.

THE LABORATORY BUILDINGS

A FEW alterations have been made in the Laboratory Buildings since the printing of our Report in 1904.

Externally, the quotation

SINE EXPERIENTIA
NIHIL SUFFICIENTER
SCIRI POTEST

taken from the works of our first Oxford Chemist, Roger Bacon, was chosen as an appropriate ornament for a tablet over the new entrance to the Daubeny Laboratory. We believe this tablet, setting forth the principle that distinguishes true Science from false, to be the first memorial erected in Oxford in honour of the great master. To give it the character of Bacon's own time, the lettering was copied from a mural inscription which was chiselled by his young contemporary, Giotto: thus we doubly recall that early renaissance which, gleaming with so much splendour in Italy both in art and learning, kindled the fire of Bacon's genius, so that for a time our Northern University shone forth with its light. We say for a time, because an all-despotic Church soon set limits to the advancement of learning. By a Papal rescript the members of a University were to 'be content with the landmarks of science already fixed by their fathers'. Woe to him who ventured further!

Some of the rooms have also been rearranged. The increase of motor-bus, motor-lorry, and other heavy traffic over the uneven surface of a road not originally made for such locomotives, rendered the top-floor rooms unsuitable for weighing and for other delicate operations. The balances of precision and sensitive galvanometers, rendered useless on account of the vibration of the upper floor, have now been moved into the 'research laboratory' on the ground floor, and parts of the

Collections have taken their place in the old Elementary Physics room. The original Photographic room has been made over to the Curator for special work, and the workshop has been moved to the east end of the building.

The amenities of the Laboratory were very seriously impaired by the addition of a new wing to the University Botanical Laboratory in 1911. The only two detached rooms in the Daubeny Laboratory having a sunny aspect (for all the others face north) were Dr. Daubeny's study, for many years the private room of the tutor in Natural Science, and a still more pleasant room above it: these were spoiled by the erection, in close proximity to their windows, of the closets and sanitary apparatus of the new Botanical Building. A needlessly high parapet not only increased the cost and badly proportioned elevation of the latter building, but by obstructing the ancient lights of the Daubeny Laboratory has greatly depreciated its value to the College. The alterations to the Botanical lecture-room, moreover, produced a settlement and cracks in the south wall of the Daubeny Laboratory.

The heating apparatus, on a patent high-pressure system with small-bore pipes and no radiators, has not been found a success. Parts of the building get over-heated, while some of the rooms are uninhabitable in cold weather. This causes great loss of time.

The arrangement of the draught-cupboard in the splay of a window facing south has been found to work most satisfactorily, for when the sun shines into it, it is self-ventilating. The advantage of good illumination is so obvious, that the arrangement has been imitated in the new University Chemical Laboratory, now in process of construction.

The electric light and power circuits were put in anew in 1909–10, and have proved adequate.

In addition to more domestic uses, the Lecture Room has been in frequent demand for the mathematical lectures of Prof. Elliott and Mr. Pedder, for Mr. Duthie's lectures on Indian Botany, and for Mr. Moore's on Electrochemistry, including courses on the Electrochemistry of Solutions and on Electromotive force (delivered four times); on Homogeneous equilibrium (delivered thrice) and on the application of Physical methods to Chemical problems. Mr. Manley's courses of instruction in Physics for boys from Magdalen College School have been continued, and have also been attended by a class of Belgian boys who are in Oxford in charge of Monsieur Locus.

THE WAYNFLETE PRAELECTORS OF NATURAL PHILOSOPHY

The first attempts we made to compare the work of Dr. Daubeny with that of his predecessors at Magdalen, were frustrated by the absence of any lists of the Waynflete Praelectors; and when with some trouble we had compiled one, necessarily imperfect, from a chronological list of the members of the College compiled by Dr. Bloxam, we found that we had conjured up a world long-forgotten, in which a state of things persisted that had come down from antiquity, and like a shadow from the Dark Ages fell across the bright path of early Victorian progress.

Dr. Daubeny was the last of a long line of Waynflete Praelectors of Natural Philosophy on the old foundation of the College. To him is due the honour of having introduced the study of Natural Science into Magdalen; but we had no conception how great the achievement really was, till we began to study the sterile methods of his predecessors.

To the President and 13 senior Fellows was confided the responsibility of selecting the Praelectors of Natural Philosophy. Their nominees were doubtless admirably qualified as *praelectors*, but the electors were certainly unfortunate in their choice of Natural Philosophers. Not once in a space of four centuries, did they even by accident, light on talent for the original investigation of phenomena upon which Natural Philosophy is based. Literary qualifications seem to have been their standard for the office: indeed the very tenure of a Praelectorship seems to have restrained any endeavour to contribute to the advancement of natural learning, even when the candidates at the time of their appointment were men of promise, as 'Pioneers' in the New Atlantis.

The principal aim of the better lecturers appears to have been to perfect their pupils in the art of dialectic fencing, of quitting themselves 'sharplie and soundlie' in their public disputations. During the latter two centuries, singularly few of their pupils were admitted to the Royal Society, or achieved any other scientific distinction. Various reasons for the failure of the Praelectors may be alleged: the income may have been insufficient to attract the best men; they had not the advantage of a College observatory, or laboratory for demonstrations; but we believe the chief reasons to have been that the Founder's statutes permitted the praelectors to lecture on moral instead of on natural philosophy, and that the 'Natural Philosophy' courses were for the greater part of the time confined to readings in Aristotle. In the philosophical studies at Oxford Aristotle thus endowed, held undisputed sway. Right up to the threshold of the 19th century, at the ceremony for taking the degree of B.A., the student when formally asked the heads of the predicables is said to have formally replied, 'Aristoteles pro me respondebit'[1]. And so ingrained was the doctrine of blind acceptance, that it was not infrequent for 'the tutors in their lectures upon many points of philosophy to tell their pupils that in the schools they must hold such a side of the argument; but that the other side is demonstrably the right side'[2]. . . Signs of progress were apparent, for in 1726, 'Locke, Clarke, and Sir Isaac Newton begin to find countenance . . . and Aristotle seems to totter on his antient throne'. But for long the Magdalen Praelectors continued his trusty retainers.

As Fowler has pointed out, in the case of Corpus Christi College, the College system was an excellent system of instruction and discipline for converting 'a body of raw youths, gathered probably to a large extent from the College estates, into studious and accomplished ecclesiastics': but this training does not make men of science.

We feel confident that it was no part of the Founder's scheme to restrict the benefits of his Foundation to students of theology or to parish priests. He desired that his Philosophers should be religious, and that his clergy should be acquainted with Natural Philosophy. Magdalen has sent thousands of ministers into the country during those four centuries: we cannot think of one who produced any good work as the result of his teaching in Natural Philosophy, or who used his opportunities as, for example, Gilbert White did his. Edmund Cartwright, among the Fellows, was in one sense an exception, but he had received his early training at University College, and though not strictly a man of science, was imbued with the right spirit. His magnificent work for the improvement of agriculture and of weaving gives him high rank among the inventors belonging to the period of great industrial revolutions.

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[1] *Oxf. Undergraduate's Journal*, 1867, p. 166.

[2] Amherst, *Terrae-filius*, No. xxi, 1721.

According to the scheme of William of Waynflete, our Founder, during a certain portion of the year, Lectures were to be read by the Bachelors in the Faculty of Arts, thrice a week, "when lawful impediment there is none, in the Nave of the Chapel, or elsewhere . . . on some useful or first-rate subject, to wit, Algebra ; or on the Treatise concerning the Sphere, or regarding the Motion of the Planets." A Person absent without reasonable cause was punished by the subtraction of his Commons to an extent proportionate to his absences.

Moreover, as our Founder "with the greatest and most glowing desire of heart" coveted "the diligent, profound and assiduous instruction, not only of the Scholars and Fellows of [Magdalen] College but also of all and singular other Students, especially those who devote themselves to the Faculties of Philosophy, and Sacred Theology in the University of Oxford", he enacted, ordained, and willed,[1] "that for all future times there be in our College aforesaid, three Lectures, fully endowed with the graces for lecturing, Morals and Sciences." Two, Masters of Arts, were "openly and publicly to lecture in Philosophy to all and singular the Scholars, well as of our College, as others also, Seculars and Regulars, who from any quarter flock to the said College, and who are desirous of hearing the said Lectures; and they are to demand nothing from their hearers; and this in such manner that one of the said Masters of Arts do lecture on Natural Philosophy, beginning about six o'clock in the morning on all working days in full Term, from the Feast of St. Dionysius to the Feast of St. Peter, called Ad Vincula."

The Waynflete Lecturer in Natural Philosophy was to have lawful and free power to lecture in Moral Philosophy, and over and above his ordinary emoluments, was to receive £6 13*s*. 4*d*. for his labours.

It was also enacted that if Readers of greater attainments, aptitude, and excellence for the purpose of giving lectures on Natural Philosophy, should be found in the University of Oxford without the College, than those within the College, and the number of the Fellows and Scholars of our College be complete, then the said more accomplished Lecturers should be taken for the purpose of the said Lectures at the aforesaid salary. Such Lecturers 'being strangers to our

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[1] *Statutes of Magdalen College*, Ward's Translation.

College, may, if they will, of whatever country or (diocese?) they are, be substituted in the next vacant places of any Fellows or Scholars withdrawing or deceasing.' Provision was also made for the payment of salary to the Waynflete Lecturer if 'any great or grievous Plague' should cause him to remove, and to continue to instruct his pupils, beyond the walls of the University.

We do not know who first undertook the duties of Waynflete Reader in Natural Philosophy, but we should like to think that it was John Perch, the first Bachelor of Physick on the roll of Fellows of the College, whose memorial brasses have been once more pieced together and restored to the College Chapel in our own time.

The appearance of a fifteenth-century Doctor of Medicine is well represented by the statue in the Cloisters of Magdalen College. (*See* the frontispiece.) He is represented in his gown, with his hood thrown across his shoulders, in the act of examining some liquid in a urine-glass, probably with the intention of thus diagnosing a malady, and perhaps of thus earning a fee to put into the somewhat empty purse which he carries in his left hand.[1]

The equipment for teaching probably consisted of a few books, and possibly of a simple armillary sphere or dial, and a pair of compasses. In 1481 a volume of 'S. Thomae super *Phisicam*' was bound for 14 pence; 9 pence was spent for the Reader in Natural Philosophy 'pro uno libro textuali naturalis philosophiae', and 6*s.* 8*d.* 'pro redemptione unius libri naturalis philosophiae, expositi in cista de Nelle pro caucione per M. Galfridum Recley.' And many more works on the same subject were no doubt included among the 800 volumes on all kinds of subjects, donated by the Founder on the occasion of his visit to Magdalen with King Edward IV, in September 1481. In the following year 'a certain book necessary for the common lecture in natural philosophy' was added to the collection, 20*s.* being paid to master John Bentley [Fellow] for it. (Macray, i. 10.) In 1500, Aristotle *De Animalibus* was bound.

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[1] Monastic physicians, like Walter of Brakelond, were permitted to take fees (Cholmeley, *Rosa Anglica*), but contemporary representations of them do not often show them purse in hand.

In the miniatures of the Middle Ages the urine-glass was the mark of a physician of the highest rank, as the mortar was of the apothecary. My friend Dr. Singer has recently published reproductions of the medical miniatures in *Ash.* 399 *Bodley* dating from the thirteenth century showing a physician who has just performed a urinoscopy. In another picture the physician's purse is carried by an attendant. Cf. *Proc. R. Soc. Med.* ix. 1915. I have to thank Sir W. Osler for drawing my attention to this paper.

Of the Fellows of the xvth century, Hugh Ashfield left a book on Natural Philosophy to the Library, and George Epworth (*d.* 1489) appears to have had quite a valuable library for his time; it included a tractatus *de astronomia et palmistria.* Both he and William Hasard, medicus, to whom he bequeathed a book, are commemorated by brasses in the chapel. It is sad to think how few, if any, of these books now remain to us.

In the following centuries, the natural philosophers, as is apparent from the following list, were frequently elbowed out of their endowment (£6 13*s.* 4*d.* per annum) by the moral philosophers, and so it is interesting to note that even in those early days, when on 25 July, 1483, King Richard III visited the College with Waynflete, the *duae solempnes disputationes* for his delectation were in moral philosophy and in theology. *Dominus Rex magnifice et honorifice,* rewarded the philosopher, *cum uno damo et quinque marcis,* but the Reader in Natural Philosophy had to comfort himself with a fraction of two does and five marks for wine, to be shared among President and Scholars generally. 'Vivat Rex ineternum' (*Reg.* A f. 27^{b}, Macray).

Students of Medicine would then, as now, have to obtain instruction out of College; from Shagglyng Lecturers in the early days, from Regius Professors, and Linacre and other Lecturers, later on.

There is probably but little more to tell of the teaching of Natural Philosophy at Magdalen during those 'dark ages'.

We find an occasional indication that some one Fellow took an interest in scientific matters, as for instance, it is recorded that in 1490 Thomas Freer bequeathed an 'armilla', and that Robert Honiman, more than a century later, possessed a Globe and a Jacob's Staff for measuring the altitude of stars. But before rushing forward to greet the owners of these instruments as brethren in Science, we should remember the purposes to which their learning was not unfrequently strained, viz. among other objects, to trace out members of the College who had absented themselves without leave, and to discover their whereabouts,—by astrology!

We now give our list, confident that by further research some names will be struck out as being those of philosophers whose lecturing was wholly on the moral instead of on the natural aspect, but also in the hope that other names may be added, names of persons famous through achievement in some one branch of natural philosophy.

The Waynflete Praelectors of Natural Philosophy.

And of Linacre's Superior Lecturers[1] *1558–1656.*

[1477 ? **John Perch.** (A suggestion).]

1484–5. — **Flint.**

Thos: Freer bequeathed an 'armilla' 1490.

1491–2. **John Roper.** 1st Margaret Prof. of Divinity 1500. Vice-Chancellor 1505 and 11.

1494–6. **Richard Gosmere.** Supervisor of building of Tower.

1496–7. **William Hasard.**

1500–4. **William Webb.**

1504–5. **Lawrence Stubbs.** President 1525–7.

1504–6. **John Stokesley.** Princ. of Magd. Hall 1502. Bishop of London 1530. Accused of trying to discover a treasure by baptizing a cat.

1505–8. **John Mullisworth.** 'Neglected duty': Lecturer in Moral Philosophy 1507.

1506–10. **John Burgess.**

1509–11. **Robert Carter.**

1510–4. **John Maryng.**

1514–6. **Geoffrey Lee.**

1517. **Nicholas Cartwright.**

1518–9. **Anthony Molyneux.**

1518–22. **Edward Wotton,** who had studied Physic at Padua. (See p. 201.)

1521–2. **John Gulston.**

1521–2. **Thomas Starkey.**

1524–6. **Thomas Burton.**

1526. **Anthony Sutton.**

1529–31. **George Cotes.** Master of Balliol 1539.

1529–31. **John Patmore.** Fellow of Eton 1538.

1534–7. **John Patmore.**

1535. **Owen Oglethorp.** [? Mor. Phil., Macray.]

1536. **George Cotes.**

1537–40. **John Hoker.**

1538–41. **John Vicaris.** [? Moral Phil., Macray.]

[1541. **Baldwin Norton,** Reader in Geography.]

1541. **John Armstrong.**

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[1] 'These appointments gradually sank to the position of College Lectureships, and ultimately sinecures held by Fellows, till the splendid revival of the foundation in the present Linacre Professorship of Human and Comparative Anatomy'. Payne.

Linacre Superior Lecturers.[1]

1542–5. **Robert Dighton.** [Macray makes Richard D. also Praelect. Nat. Phil.]

1543. At a Visitation of the University, Dr. Layton reported to Cromwell 'Pleasit your goodnes to be advertisyde that in Magdalen College we fownde stablisshede . . . two [lectures] of Philosophie, one Morale, another Naturale well kept and diligently frequentide'. *Blox.* iii. 90.

1546–8. **Richard Slithurst.**

1549–50. **John Mullins.**

1551. **Michael Renniger.**

1552. **Laurence Humfrey.**

1553. **John Piers.**

John Flower, B.A., and Barker, demy, were warned for cutting philosophical lectures.

1555. **Alan Cope.**

Th. Emley punished Nov. 4, 1555, 'eo quod non habuit librum in lectione naturali,' which punishment was no doubt so beneficial that he became Praelector in 1561.

1556. **Robert Warde.** Fellow of Merton.

1557. **Adrian Hawthorn.**

1558. Robert Barnes, Fellow of Merton.

1558–9. **Thomas Perry.**

1560. **Bartholomew Grene.** ? of Balliol.

1561. **Thomas Emley.**

1562. **Thomas Perry.**

1562. **John Day.**

1563–5. **John Kingsmill.**

1566–71. **Henry Buste, M.D.**

1566, Sept. 3. Q. Elizabeth heard disputations on Nat. Phil.

1571–2. **Christopher Wade.**

1573. **William Powell**

1574–6. **Christopher Gregorie.**

1577–8. **Isaac Upton.**

1580–4. **James Bisse.**

'Our philosophie disputations are more carelesly and lightly looked unto then in any colledge of this towne (yf there be any at all), to the great hinderance of learning and no small discredite of this Colledge. They are as yf they were not.

---

[1] Linacre attached his Lectureships to Merton, because that College had a great reputation among medical students. The Lecturers were obliged to explain Hippocrates and Galen to the younger students.

Linacre Superior Lecturers.

. . . J. Bisse hath kept a philosophy lecture this twelvemonth and more, not reading 2 lectures. . . . By the space of 3 quarters or there about of this last year [1584], he haith been in Parrhise [Paris] and as yet kepeth that lecture' (*Macray*, ii, p. 107).

1586–91. **William Sterrill.**

1591–2. **John Parkhurst.** Master of Balliol 1617.

1593–1606. **John Budden,** D.C.L. [Not a Fellow]. Regius Prof. of Civil Law 1611.

1604. Thomas Dochen, M.D.

1604. Henry Bust, M.D. Fellows of Magdalen.

1606–14. **Edward Othen.**

1610–11. **Thomas Mason.**

1612–13. **Vincent Goddard.**

1614–16. **Accepted Frewen.**[1]

1615–17. **Robert Hitchcock.**

1617. Bart. Warner, M.D., St. John's.

1618–30. **Christopher Collard.**

1619. Edw. Lapworth, M.D., Magdalen.

1624–27. **William Pincke,** of Magdalen Hall.

1629–33. **Henry Hammond.**

1635. John Bainbridge, M.D., Cambridge.

1631–38. **John Aubrey.** B. Phys.

1643. Edward Greaves, All Souls.

1634–40 Thomas Fox, President of College of Physicians.

1639–48. **John Cheeke.** [Expelled by Parliamentarian visitors '48.]

Henry Clerke, Demy, Praelector of Anatomy, F.R.S. 1667, President 1672, may have been one of Cheeke's pupils.

1648 — Joshua Crosse, Sedleian Professor of Nat. Philosophy.

1649. **John Duckfield,** M.A., Cantab. elected 14 Nov.

1649 Both Readers, Hobbs and Dale, were Moral Philosophers.

1654 Henry Yerbury, took his D.Ph. Padua.

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[1] One of his pupils was Sir James Long (1613–5$\frac{8}{9}$). Westminster scholar; of Magd: coll: Oxon. 'great falkoner and for horsemanship; for insects; exceeding curious and searching long since, in naturall things.'

Linacre Superior Lecturers.

1650. — 1650. Daniel Whistler, M.D., Merton.

1652–7. **Thomas Thackham.** — 1653. Richard Lydall, Stud. Med. Merton.[1]

1653–9. **William Browne,** examiner in the Nat. Phil. School 1652. He is said to have had the chief hand in the compilation of the *Catalogus Horti Botanici Oxoniensis.*

1656. Edm. Dickinson, M.D., Merton.

1658–9. **William Hawkins.**

1661. **John Dobson** or **John Fitzwilliams.**

1662. **Daniel Hartford.**

1668. **John Fenis.**

1669–77. **Daniel Hartford.**

1678–83. **Francis Smith,** M.D.

1703 James Fayrer, a Fellow 'all guts and no brains', appointed to be Natural Philosophy Professor.[2]

1693 4^{s} 6^{d} worth of quicksilver was purchased by the College of Mag. White chimico, for their thermometer.

–1719. **Thomas Goodwyn.**

1721 John Woolhouse elected F.R.S.

1719. **Charles Holt.**

1738. **John Audley.**

H. Sibthorp, appointed Sherardian Prof. of Botany.

1747. **William Bracebridge.**

1751. **Andrew Etty.**

1765. **Francis Drake.** His 'Travels in Italy' in MS. are in Magd. Coll. Library.

1767. **Benjamin Wheeler.** Sedleian Professor of Nat. Phil. 1767–82.

G. S. Gibbes, elected F.R.S. (*Macray*, v, p. 134).

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[1] Lydall had been Inferior Linacre Lecturer in 1650.

[2] 1719/20. Tuesday, Feb. 23. This morning at eight Clock, the Bell[s] at Magd. Coll. and St. Peter's in the East rung out for Dr. James Fayrer (S.T.P.) . . . Publick Reader of Natural Philosophy. He died of the Dead Palsy, in the College. He was a very proud, haughty man, of no learning, & therefore altogether unfit for the Natural Philosophy Lecture.

Feb. 26. Ch. Bertie, Fellow of All Souls, was elected Reader in the room of Dr. F. deceased, not upon account of any skill (for he hath none) in Natural Philosophy but because he is much in debt to the College, occasioned by his negligence when Bursar. . . The Electors are the Vice-Chancellor, the President of Magdalen, and the Warden of All Souls. (Hearne's *Diary*).

1804. **Edward Ellerton.**
1810. **Thomas Nixon Blagden.**
–1846. **Richard Clarke Sewell.**
1850. July 25. The following Order was passed by the College:

A Lecturer in Natural Philosophy to be appointed, who shall devote one day at least in each week during Term to preparing pupils for passing the University Examinations, and to receive £50 annually from the Sheppard Fund.

1853. **Charles Giles Daubeny.** (*The Last Waynflete Praelector of Natural Philosophy.*)

Some lapses in the filling up of the Praelectorships had not passed unnoticed beyond the walls of the College.

On 20 March, the Radcliffe Observer, Mr. Manuel J. Johnson, made certain statements in a debate in Congregation which were reported in the *Oxford Herald,* and which reflected on the action of Magdalen in the matter of College Praelectorships. A correspondence with the President ensued, which was printed on 24 April, 1855.

President Bulley in an effective reply stated that in 1837 the College had taken steps to ensure the active working of the system, and that the elections to Praelectorships were made by the 13 senior fellows, in whom in those days the principal administrative powers were vested.

It was part of Johnson's criticism that "the Offices have been allowed to fall into disuse", to which Bulley added, "as much probably from alterations in the Educational System of Oxford, as from neglect on the part of the College." Some amusing Latin verses, satirizing the Observer, were written by Edward Stokes of Ch. Ch. (Macray).

Certainly there appear to have been considerable gaps in the succession of Natural Philosophy Praelectors during the second half of the eighteenth century, yet this very period synchronizes with the rise of perhaps the greatest inventive genius ever connected with Magdalen, one whose work has contributed materially to the industrial prosperity of England. An account of Edmund Cartwright's life has been written by his daughter[1]: we merely give a summary of it here.

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[1] M. S[trickland]. *A Memoir of the Life, Writings, and Mechanical Inventions of Edmund Cartwright, D.D., F.R.S.* London, 1843.

Edmund Cartwright, D.D., F.R.S.

1743, April 24. Born at Marnham, co. Notts.
Grammar School at Wakefield.

1757. Matriculated at University College, Oxford.

1761–3. Wrote verses.
Elected Fellow of Magdalen College.

1770. *Armine and Elvira.*

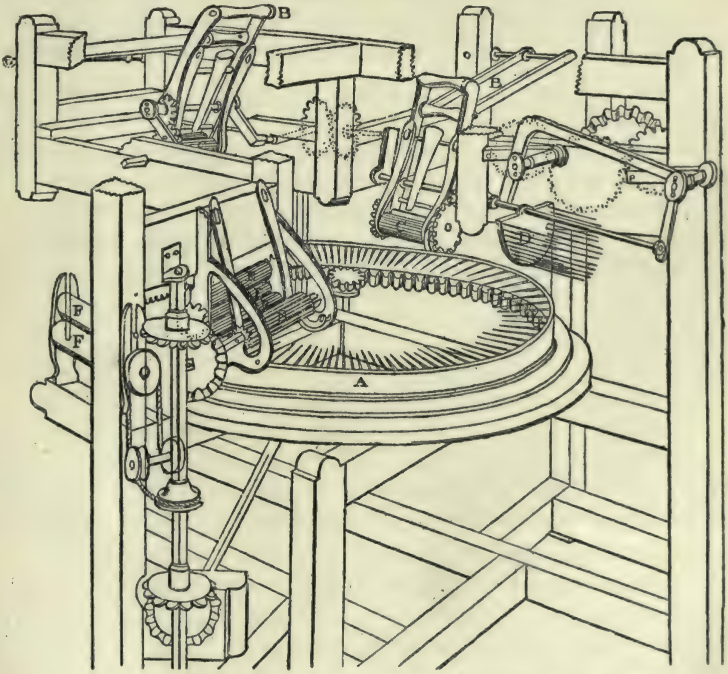
1772. Married Alice, y. da. of Richard Whitaker of Doncaster.
Presented to the perpetual curacy of Marnham.
Discovered a successful treatment for putrid fever, viz. yeast. *Cf.* Beddoes, 'Considerations on the Medicinal Use and Production of Factitious Airs.'

1779. Moved to Goadby Marwood in Leicestershire.
Contributed articles and reviews to the *Monthly Review*; e.g. reviews of 'An American Farmer's Letters', by Hector St. John, and of Dr. Johnson's 'Lives of the Poets'.

1785, April 4. First Patent for a machine for weaving (the Power Loom). Improvements in 1786, 7, 8, 90.

1785. Moved to Doncaster.

1789, Aug. 22. Patent for Wool-combing machine. (*See figure.*)



Dr. Cartwright's 'Big Ben', or Wool-Combing Machine.

1791. Messrs. Grimshaws of Manchester contracted for 400 Cartwright looms, but soon after twenty-four had been set to work, the mill was destroyed by an incendiary.

1795. Patent for grooved bricks, for building arches.

1796. Moved to Marylebone Fields, London.

1797, Oct. Patent 'for an incombustible substitute for certain materials commonly used in constructing dwelling-houses'.

Application of treadmill to working of cranes.

1797, Nov. 11. Patent for a steam-engine.

Described in the *Philosophical Magazine*, June 1798, and in Stewart's *Descriptive History of the Steam-engine.*

Correspondence with Fulton.

1798, Nov. Member of the Society for the Encouragement of Art Manufactures, &c.

1799, Oct. Candidate for post of Secretary to the Society of Arts, but withdrew in favour of Mr. Charles Taylor.

1801, March 17. Petition to House of Commons for extension of his patent-right.

June. Awarded a prize for an Essay on Agriculture.

Autumn. Appointed Director of the Duke of Bedford's Experimental Farm at Woburn.

1803. Awarded Silver Medal of the Society of Arts for the invention of a three-furrow plough.

1804. Honorary Member of Board of Agriculture.

1805. Gold Medallist of Board of Agriculture.

Paper on the efficacy of salt as a manure. *Phil. Mag.* xxiii, p. 16.

1806. Essay on Culture of potatoes.

Purchased and retired to a small farm at Hollanden near Tunbridge.

1809. Granted £10,000 by H.M. Government 'for the good service he had rendered the public by his invention of weaving'.

Experiments on the effects of sugar in fattening sheep.

1819. Endeavoured to naturalize Sumatran plants in England.

Proposal that Bank Notes should be printed on a special paper.

Cure for mildew on wheat.

Proposal for driving a locomotive carriage by man power. *Phil. Mag.* liii, p. 425.

Elected F. R. S.

1823. Invention of a gunpowder-explosion engine.

1823, Oct. 30. Died: buried at Battle in Sussex.

THE DAUBENY LECTURE LISTS

See Appendix E. (*Hist. Daub. Lab.*, pp. 65–111 and p. 197 of this vol.)

BEFORE the end of a very few more years, those who wish to do so, will be able to celebrate the centenary of Dr. Daubeny's Inaugural Lecture, as Aldrichian Professor of Chemistry. Sufficient time has therefore elapsed to enable us to appraise the general effect of his teaching and the success in life attained by some of his hearers.

The lists made of those who attended his instruction are probably incomplete: indeed, we have heard in several cases of students who for some trivial reason avoided entering their names in the attendance book. But on the whole the lists are representative of the class of men who went to Chemical Lectures at Oxford during a period roughly coincident with the first 50 years of the life of Queen Victoria.

In the lists as printed, only first attendances are noted, so that the number of names is no true indication of the number of persons present at any particular lecture. Some keen students, like Sir Henry Acland, subscribed to an "unlimited attendance" at the Lectures on Chemistry, and no doubt repeated the course. The lists take no note of duration or frequency of attendance.

During the period of 46 years 886 names are entered, and, as many of the audience did not sign the register, we shall probably not be far wrong in estimating that quite 1,000 persons heard Dr. Daubeny's Chemical Lectures.

In such a space of time new attendances fluctuated greatly, the extremes being 2 and 96 in a year; and the numbers appear to be fairly well correlated with periods, defined by particular events. Of these events, the most important were the transference of the Chemical Demonstrations from the vaulted cellars under Ashmole's 'ample dome' to the newly built and more cheerful Laboratory by the Physic Garden in 1849, and Daubeny's resignation of the Professorship of Chemistry in 1854. Notwithstanding his resignation, and the appointment of a successor (Sir Benjamin Brodie), Dr. Daubeny still continued to lecture on Chemistry though on a restricted syllabus, and principally in relation to Agriculture, and drew considerable audiences. He also commenced the course of tutorial or catechetical Lectures on Chemistry to Members of Magdalen College, which he continued for 13 years until his death.

Thus his lecturing activity was divided into 3 periods:

1. Professorial Lectures at the Ashmolean for 27 years. (1822–48.)
2. Professorial Lectures at Magdalen for 8 years. (1849–56.)
3. Tutorial Lectures at Magdalen for 13 years. (1855–67.)

So far as mere numbers go, the lectures may be further grouped in 5 periods, as shown in the following table:

	PROFESSORIAL LECTURES				TUTORIAL LECTURES
	at Ashmolean (27 years).		at Magdalen (8 years).		at Magdalen (13 years).
Average Entry	**24** for 10 years 1822–31	**8** for 17 years 1832–48	**24** for 5 years 1849–53	**73** for 3 years 1854–56	**13** for 13 years 1855–67

The great falling-off in the numbers after the first ten years, reducing the class to one-third, was principally owing to the fact that Daubeny's earlier audiences were largely composed of resident graduate members of the University who were attracted by the interest and novelty of the subject and by the eminence of the Professor. In those days senior members of the University did not spend as much time as they do now, in attending Committee Meetings, and had in consequence more time to give to intellectual attainments. The audience at a Scientific Professor's lecture in those days differed both in age and aspect from one at the present time, as we see in the drawing of one of Buckland's Lectures at the Ashmolean, in 1822. Dr. Daubeny is one of the number.

> In Ashmole's ample dome, with look sedate,
> Midst heads of mammoths, Heads of Houses sate;
> And tutors, close with undergraduates jammed
> Released from cramming, waited to be crammed.[1]

Another reason for the falling-off in the numbers may be given. On and after 1834 Daubeny's new duties as Professor of Botany prevented him from devoting quite as much time to Ashmolean Chemistry as he had previously done: but he still retained his former interests, for in 1840 he printed a new *Syllabus on a Course of Lectures on Chemical Philosophy*.

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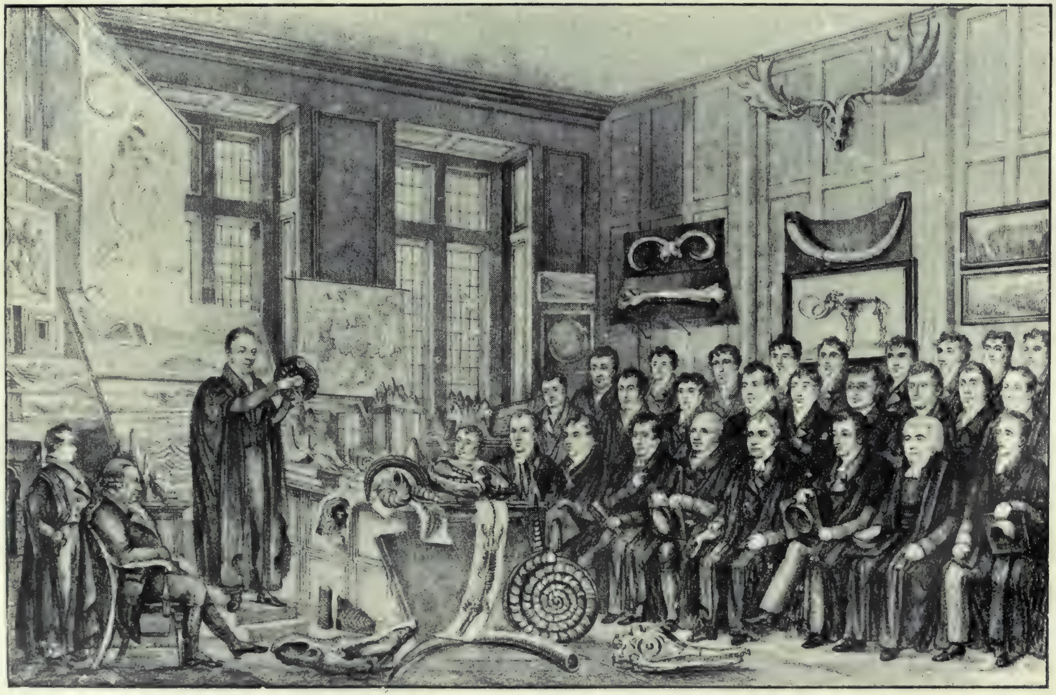
[1] Attributed to Bp. Shuttleworth. *Fugitive Poems*, collected by Daubeny, p. 84.



A LECTURE ON SCIENCE IN 1822.

Dr. Daubeny is standing in the left-hand corner.

Reprinted from Mrs. Gordon's "Life of Buckland," with permission of Mr. John Murray.

The Classes, which had dwindled during the remainder of his sojourn at the Ashmolean Museum, increased notably after the removal to the new Laboratory at Magdalen, and again increased in consequence of the new Statute which made attendance on a course of Professorial Lectures compulsory on those who sought a degree. Principally in consequence of the operation of this statute, 96 names appear in the lecture list for 1854, and there have been those who suggested that Daubeny's course was more largely attended by undergraduates than those of other science Professors, because he lectured in the evening. But the counterfoils of the certificates of attendance at Science Lectures still preserved in the University Archives, show that Robert Walker, the Professor of Natural Philosophy, who lectured in the day-time, drew even larger classes. In fact, the full attendances of the years 1854 and 1856 had not been approached since the years 1773–7, when the average at the public lectures in Natural and Experimental Philosophy was close upon fifty. (*Daub. Lab. Hist.*, foot-note, p. 6.)

But success is not always to the big battalions; and in some of Daubeny's shorter lecture lists we find the most distinguished names. It is not given to many lecturers on Science to have taken a part in the education of a President of the Royal Society, of a President of the Chemical Society, of three Archbishops (Canterbury, York, and Dublin), of a Governor-General of Canada, and of a Lord Chancellor. But as the occasional appearance of a brilliant meteor is no sure guide to the ordered motions of the solar system, so the marked pre-eminence of an individual auditor in a lecture-list is no indication of the professions and successes of the majority of his less fortunate or less talented contemporaries. For a comparison of the careers of Daubeny's pupils with those of the scientific undergraduates of other ages, a more detailed analysis is necessary.

For this purpose we have attempted a census of those whose names appear in the Lecture Lists according to their subsequent careers. Members of some professions, e. g. the church, law, or medicine, are easy to trace, but other names, especially those of country gentlemen, are elusive and hard to use in our statistics. A large proportion of these therefore come under the heading of 'Miscellaneous' in the tables. A few landed gentry appear under the head, 'County',—a category which with better knowledge would certainly be much increased from the 'Miscellaneous'.

TABLE OF PROFESSIONS OF

	1822–3	1824–5	26	27	28	29	1830	31	32	33	34	35	36	37	38	39	1840	41	42	43
Graduates (Lay)	4	2	2	4	6	1	...	3	1	...	...	2	1	...	...	...	1	...	...	1
„ in Orders	5	6	18	15	10	6	6	7	...	...	1	2	...	...	...	...	...	...	...	4
Clergy ...	9	3	8	11	3	3	7	9	4	...	1	4	3	3	6	1	2	3	...	...
Doctors ...	3	2	4	2	...	1	1	...	1	...	1	...	3	1	1	1	...	..	...	...
Lawyers ...	2	1	2	2	...	1	...	4	1	...	1	1	1	...	1	...	2	...	1	...
F. R. S. ...	1	...	2	...	2	1	...	1	...	...	...	1	...	...	...	...	...	...	...	...
County ...	...	...	...	3	...	1	...	4	1	...	...	1	...	1	...	...	...	...	...	1
Schoolmasters	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Civil Service ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Miscellaneous...	9	3	12	7	4	6	2	6	4	...	6	3	3	5	2	...	2	3	3	1
	33	17	48	44	26	20	16	34	12	...	10	14	11	10	10	2	7	6	4	8

TABLE OF PROFESSIONS OF

	1869	1870	1	2	3	4	5	6	7	8	9	1880	1	2	3	4	5	6
Clergy ...	9	4	...	1	...	...	3	2	1	1	1	1	...	3	1	2	3	1
Doctors ...	4	...	...	...	1	6	5	6	2	8	4	5	5	3	...	1	...	1
Lawyers ...	1	1	...	2	...	...	...	2	1	1	...	1	1	...	...	...	...	1
Science ...	5	...	...	1	1	1	...	...	...	1	1	1	1	...	3	...	...	1
Schoolmasters	5	1	1	2	...	...	1	1	2	...	...	1	2	...	...	4	...	2
Civil Service ...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
Miscellaneous	12	3	1	11	...	3	5	7	4	9	5	1	8	3	2	3	5	3
	36	10	2	17	2	10	14	18	10	20	11	11	17	9	6	10	8	9
Classes in the Schools.																		
I ...	2	1	1	3	1	...	1	3	...	2	...	2	1	2	2	2	...	1
II ...	...	...	...	1	...	2	...	1	1	...	...	2	2	...	1	1	...	...
III ...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	1	...	...
IV ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Pass. ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	4	8	5

DR. DAUBENY'S STUDENTS.

44	45	46	47	48	49	1850	52	53	54	55	56	55	56	57	58	59	1860	61	62	63	64	65	66	1867
...	...	1	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1	...	2	1	1	8	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	5	4	5	1	3	6	22	20	38	36	20	3	5	4	3	7	3	4	7	2	4	2	1	6
...	1	...	1	...	1	1	1	2	2	...	...	...	2	...	...	...	...	1	...	...	...	...	2	...
...	3	2	...	...	1	...	2	2	13	12	10	...	1	2	1	2	4	2	1	4	2	5	3	2
1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...
...	...	...	...	2	...	2	3	1	6	1	2	...	...	1	2	1	...	1	1	...	1	...	1	...
...	...	...	...	...	...	...	...	...	3	2	...	...	...	...	...	...	1	...	3	3	3	...	...	2
...	...	...	...	...	...	...	2	1	7	1	2	...	1	1	...	...	2	...	1	...	...	1	2	...
1	4	5	2	5	3	5	15	18	26	19	20	3	1	4	3	8	2	...	4	10	6	4	2	6
3	13	14	9	10	16	14	46	44	96	71	54	6	11	12	8	18	12	8	17	19	16	13	11	16

SCIENCE STUDENTS 1869–1910.

7	8	9	1890	1	2	3	4	5	6	7	8	9	1900	1	2	3	4	5	6	7	8	9	1910
...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1	2	3	2	3	1	3	1	2	2	5	...	2	...	1	1	2	1	...	2	...	...	1	3?
1	2	1	...	...	...	1	...	...	...	...	...	1	...	...	1	2	...	1	...	...	1	...	...
...	...	3	...	1	2	2	...	1	...	1	4	...	...	2	1	...	2	2	1	3	3	...	1
2	...	...	1	...	1	3	1	...	...	...	...	...	1	2	...	...	2	2	1	...	...	...	...
...	...	...	...	...	...	...	1	...	...	1	...	1	...	...	1	...	1	3	...	...	...	1	1
6	3	1	4	2	4	3	2	3	1	3	3	6	2	3	5	5	2	4	2	3	2	5	1
10	8	9	7	6	8	12	5	6	3	10	7	10	3	8	9	9	8	12	6	6	6	7	6
...	2	5	...	...	1	2	1	2	1	2	1	2	...	4	1	1	3	2	1	1	2	...	1
3	1	1	...	1	2	5	...	1	1	2	1	1	1	2	3	...	2	1	...	1	1	2	3
...	2	...	3	3	1	4	1	1	...	2	2	2	...	...	2	5	2	1	1	...	1	2	2
...	...	1	1	2	...	...	...	1	...	1	...	1	...	...	...	1	...	...	...	...	...	...	...
7	3	1	3	...	4	1	3	...	...	3	2	4	1	2	1	1	1	...	2	...	...	...	...

In the next table these figures are grouped in periods, corresponding with those suggested on p. 154.

	Years 1822–31	1832–48	1849–53	1854–56	Total 1822–56	1855–67	Total 1822–67	Percentage
Graduates, Lay ...	22	8	1	...	31	...	31	3%
„ in Orders	73	12	8	1	94	...	94	11%
Clergy	53	42	51	94	240	51	291	33%
Doctors	13	10	5	2	30	5	35	4%
Lawyers	12	12	5	35	64	29	93	11%
F.R.S.[1]	7	5	...	4	16	6	22	2%
County	8	6	6	9	29	8	37	4%
Schoolmasters ...	1	...	...	5	6	12	18	2%
Miscellaneous ...	49	47	41	61	198	48	246	27%
Civil Services ...	...	...	3	8	11	8	19	2%
	238	142	120	219	719	167	886	99%

The first point which will strike any one familiar with the after-careers of the modern students of Natural Science is the very large proportion, about a third on the average, of the undergraduates who went to Chemical Lectures in Daubeny's day, who took Holy Orders. In 1855 more than one half of his large audience adopted the Church as a vocation. Out of his 886 auditors, 385 were either ordained or subsequently took Holy Orders, the majority becoming parochial clergy.

The numbers of men entering the same professions in more recent times are indicated in the lower table on p. 156, and may be summarized as follows:—

	Totals							Percentages
	1869–83		1884–93		1894–1910			
Clergy ...	27	+	8	+	0	=	35	9%
Doctors ...	49	+	17	+	23	=	89	22%
Lawyers	10	+	6	+	6	=	22	5%
Science ...	15	+	9	+	21	=	45	11%
Schoolmasters	16	+	13	+	9	=	38	10%
Civil Service	2	+	0	+	10	=	12	3%
Miscellaneous	74	+	34	+	52	=	160	40%
Totals	193	+	87	+	121	=	401	100%

The effect of the Honour Examinations.

The large and intellectual audiences who, being genuinely interested in scientific subjects, used voluntarily to hear professorial lectures at the beginning of the nineteenth century, were thinned by the establishment of the Final Honour Schools.[1] The men of ability who would of their own inclination have devoted much of their time at the University to becoming acquainted with the truths and principles of Science were told that the study of Natural Science was waste of time, and were coerced into concentrating their energies on matters of no other intrinsic importance, save that tutors insisted on them as being needful for winning a class in the Schools.

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[1] Or other first class distinction.

The Final Honour Schools were intended as a first step towards Reform, but they were engineered by one party in the university in favour of their own studies and to the exclusion of all others. It is not surprising therefore that the exclusive encouragement held out to one particular form of learning should have exerted a sinister influence upon the cultivation of all the rest.

Dr. Daubeny demonstrated the truth of this by convincing figures of the attendances on the lectures of the Professors before and after 1828.

	Average annual attendance		
	Before 1828.	After 1828.	1835–8
Chemistry (Daubeny)	28	14	10
Anatomy (Kidd)	29	17	8
Natural Philosophy (Rigaud)	42	10	2
Geology (Buckland)	50	30	...
Mineralogy (Buckland)	30	15	...

In 1848, in his *Brief Remarks on the Correlation of the Natural Sciences*, Dr. Daubeny suggested the propriety of imposing attendance on two courses at least of Public Lectures during the third year of residence.

A further result of the institution of the Final Honour School was the serious falling off in the numbers of Doctors of Medicine. In 1837 there were said[2] to be only a hundred doctors in England who were graduates of Oxford or Cambridge, and Daubeny had already lamented the shortage, saying that it would soon be impossible to find an Oxford man to take the post of Physician to the Radcliffe Infirmary. Cox recollected that in the summer of 1841, Oxford was tauntingly asked why she was so slow in producing Doctors in Medicine—one or two in a year,—whilst the Senatus Academicus of Edinburgh could bring forth 103 M.D.s at one litter. "We could only answer as the lioness did to the rabbit, 'But mine is a lion.'" (Cox, p. 322.)

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[1] Class Lists were introduced in 1807. Physical Sciences were made subjects for examination in 1849.

[2] *Quarterly Review.*

A comparative study of the successes of members of the several Colleges as revealed by the Honour Lists of the School of Natural Science is not without interest. The totals are printed in the Table, with a column showing the percentage of the men who obtained First Class Honours in each College. The figures cover the period of 35 years, from 1880 to 1914, immediately preceding the outbreak of the Great War.

During the last two decades of the XIX^th^ century, Christ Church, New College, Magdalen, and Balliol were the leading scientific Colleges, and in the number of honour men they are still well ahead of all the rest. During the last ten or fifteen years, however, honour men belonging to several of the other colleges, St. John's, Jesus, and University for example, have largely increased, though they have not, as a body, done so well in the Schools as the men from the longer-established scientific Colleges.

TABLE OF HONOURS IN SCIENCE 1880–1914.

	I		II		III		IV		Total.	Percentage of Firsts.
Christ Church ...	58	+	55	+	34	+	14	=	161	36
New College ...	46	+	61	+	36	+	18	=	161	28
Magdalen ...	52	+	42	+	39	+	11	=	144	36
Balliol	45	+	43	+	27	+	9	=	124	36
Trinity	21	+	38	+	28	+	13	=	100	21
St. John's ...	17	+	27	+	34	+	22	=	100	17
Jesus	15	+	36	+	32	+	8	=	91	16
Keble	20	+	24	+	29	+	11	=	84	23
Merton	23	+	28	+	19	+	4	=	74	31
Queen's	15	+	27	+	23	+	8	=	73	20
Exeter	10	+	29	+	23	+	11	=	73	13
University ...	8	+	23	+	23	+	17	=	71	11
Non-Collegiate ...	5	+	29	+	23	+	9	=	66	7
Brasenose ...	9	+	13	+	11	+	8	=	41	22
Hertford ...	10	+	14	+	11	+	4	=	39	25
Wadham ...	8	+	12	+	11	+	3	=	34	23
Corpus	10	+	11	+	5	+	1	=	27	37
Oriel	1	+	7	+	13	+	5	=	26	4
Lincoln	2	+	9	+	6	+	3	=	20	10
Pembroke ...	4	+	6	+	7	+	3	=	20	20
Worcester ...	4	+	2	+	2	+	3	=	11	36
Total ...	383	+	536	+	436		185	=	1540	25 %

The numbers given, have moreover this peculiar interest. They show that in the Natural Science schools, taken all together, more than fifteen hundred men took honours in 35 years, or an average of 44 per annum. Of these

25 %	obtained	I	Classes.
35 %	„	II	„
28 %	„	III	„
12 %	„	IV	„
100			

The statistics show the surprising result, that notwithstanding the differences of staff and of teaching methods in different Colleges, the percentage of First Classes obtained by the leading and more successful Colleges, 5 in all, are almost identical, and are slightly over 36 %—save only in the case of the small body of honour men from Corpus, whose members have been more successful than the members of any other College in avoiding the Fourth Class. Their percentage of I Class men works out at 37 %.

Whereas Christ Church and New College tie for the first place as regards total number of Honour men, with 161 each, Magdalen and Christ Church alone have obtained over 50 first classes in Science Schools. And it is noteworthy that the three leading Colleges in the percentages of firsts, Christ Church, Magdalen, and Balliol (New College, in this respect, is some way behind) are the three Colleges which have had the benefit of private laboratories for the longest period. Also, since the opening of the Laboratory at Jesus College, the success and number of the Jesus honour men have markedly improved.

The Honour men from the four leading colleges, Christ Church, Magdalen, Balliol, and New College together obtained nearly twenty more first classes than the men from all the other colleges taken together.

So far as minor 'records' go:

Magdalen is the only college which has obtained 4 first classes in two different years. Christ Church men have not appeared in the first class in 5 years only out of the 35.

New College is facile princeps in the total number of II Class men, and also holds the record for a single year (8 in 1911).

St. John's and Jesus tie in the matter of 6 III Class men in one year each, and more than a tenth of the IV Class is provided by the former college.

Table of Honours obtained by Demies, Exhibitioners,

Those who have advanced their science by

Classes.	1883	84	85	86	87	88	89	1890	91	92	93	94	95
Chemistry													
I	D	E	...	D	...	D	DC	...	...	E	DD	E	D
II	...	D	...	...	DC	D	...	...	D	DE	DD C	...	...
III	...	C	...	...	...	DC	...	C	CC	C	...	...	C
IV	...	...	...	C	...	...	...	C	...	...	...	...	C
Physiology													
I	...	D	...	...	...	DD	CC	...	...	...	...	...	E
II	C	...	...	...	C	...	D	...	...	...	...	...	C
III	...	...	...	...	...	...	...	DC	C	...	C CC	C	...
IV	...	...	...	...	...	...	C	...	CC	...	...	...	...
Physics													
I	...	...	...	...	...	...	...	...	...	...	...	...	...
II	...	...	...	...	...	...	...	...	...	...	...	...	...
III	...	...	...	...	...	...	...	...	...	...	C	...	...
IV	...	...	...	...	...	...	...	...	...	...	...	...	...
Zoology													
I	...	...	...	...	...	...	D	...	...	...	...	...	...
II	...	...	...	...	...	...	...	...	...	...	C	...	...
III	...	...	...	...	...	...	...	...	...	...	...	...	...
IV	...	C	...	...	...	...	...	...	...	...	...	...	...
Botany													
I	D	...	...	...	...	...	...	...	...	...	...	...	...
II	...	...	...	...	...	...	...	...	...	...	C	...	...
III	...	...	...	...	...	...	...	...	...	...	...	...	...
IV	...	...	...	...	...	...	...	...	...	...	...	...	...
Geology													
I	...	...	...	...	...	...	...	...	...	...	...	...	...
II	...	...	...	...	...	...	...	...	...	...	...	...	...
III	...	...	...	...	...	...	...	...	...	...	...	...	...
Pathology	...	...	...	...	...	...	...	...	...	...	...	...	...

COMMONERS, AND RHODES SCHOLARS OF MAGDALEN COLLEGE.
original research are indicated by blacker type.

96	97	98	99	1900	1	2	3	4	5	6	7	8	9	1910	11
...	**C**	...	...	...	D DD	...	...	**D**	**D**	**D**	**D**	**E**	...	...	D
...	...	**E**	...	E	**D**	...	...	E	...	...	...	...	E	**E**	...
...	...	...	C	...	...	E	CC CC	C	...	...	...	C	...	...	...
...	...	...	C	...	...	...	C	...	...	...	...	...	...	...	...
D	**D**	...	**E**	...	**D**	...	**E**	...	...	...	...	...	...	...	...
C	...	...	C	...	...	...	...	C	...	...	...	...	C	A	...
...	C	...	C	...	...	...	...	...	...	...	...	...	...	CC	...
...	C	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	D	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	E	...
...	...	...	...	...	...	...	C	...	D	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	**D**	...	...	...	...	...	**C**	...	...	...	...	...	...	...
...	**E**D	...	...	...	**C**	...	...	...	...	...	**E**	...	...	...	...
...	**C**	**C**	...	...	...	...	...	...	...	...	...	...	C	...	...
...	...	...	...	...	**C**	...	...	...	**C**	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	E	...
...	...	...	...	...	...	...	...	...	...	...	...	**D**	...	...	...
...	...	...	...	...	...	...	...	C	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	**E**	...	D	R	...	...	R	...	...	...
...	...	C	...	...	...	...	...	...	**C**	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	**C**	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	**R**	...	...	...	...

RESEARCH STATISTICS.

For what is freedom, but the unfettered use
Of all the powers that God for use had given?
But chiefly this him first, him last to view
Through meaner powers and secondary things
Effulgent, as through clouds that veil his blaze.
For all that meets the bodily sense I deem
Symbolical, one mighty alphabet. COLERIDGE.

The table on p. 162 exhibits the comparative success of the Foundation-members (D), of exhibitioners (E), and of commoners (C) in the class lists in the case of a single College; the College chosen being naturally the one with which I am best acquainted. The years are those of the first appearance of the name in the Register. But the table is intended to be more than a mere abstract of the class lists. By the use of clarendon or black type it shows the extent to which men who have obtained honours in the Final Schools of Natural Science, have been able to do their bit by advancing their respective sciences.

The proportions of the 'researchers' or those who have published original scientific observations, to the 'non-researchers' in seven sciences are given in a condensed form in the following table:—

	Total obtaining Honours.		Non-Researchers.		Researchers.	Percentage of Researchers.
Chemistry ...	58	=	43	+	15	26 %
Physiology ...	35	=	23	+	12	34 %
Physics ...	5	=	5	+	–	0 %
Zoology ...	14	=	3	+	11	78 %
Botany ...	5	=	2	+	3	60 %
Geology ...	7	=	4	+	3	43 %
Pathology ...	1	=	–	+	1	100 %
	125		80	+	45	

The truly enormous differences between the percentages of researchers on the biological and on the physico-chemical sides, that is between the men of the wider and of the less wide preliminary education, are most unexpected and suggestive. Indeed to a certain extent these percentages may be taken as a criticism of the methods of training in vogue in the two categories of subjects.

By adding up the numbers from another point of view, in all the sciences lumped together we find that for every foundationer or exhibitioner who has brought a research to a successful conclusion, 1·2 have not, whereas for every commoner who has attempted and finished a research, 3 have not.

NOTES ON APPENDIX G.

Not least among the lessons the nation should be learning during the progress of this war is the importance of the men who can do the practical scientific work of the country. They are not so many and successors are not easy to find. Many irreplaceable lives were sacrificed in the early days owing to lack of a sense of proportion amongst those in authority, and to their ignorance of the antecedents or special qualifications of the men whose destinies they were suddenly called upon to control. It is on account of the consequent shortage of experts in many branches of science, that we now publish the bibliographies contained in Appendix G: due consideration paid to such records in the future may help to avoid wastage the country can ill afford.

The Head Masters at their conference on December 23, 1915, passed an important resolution to the effect:

'That in the opinion of this conference very grave loss to the country is caused by the employment of young students of exceptional mathematical and scientific ability as subalterns in Line battalions.'

When a student has been one of the ablest boys in a large school, has beaten the best boys from other schools in open competition for a University scholarship, when he has been one of the most promising undergraduates of his time, has ended his University career with a high class in a final honour examination, and when, more important still, has shown marked ability to advance natural knowledge, we think that a man of this stamp should not be put to serve his country in the trenches. A government that was wide awake would see to it that he was employed on work for which his exceptional abilities fit him. When in addition to these qualifications the man in question is also the possessor of inherited and therefore of transmissible qualities, his survival may be still more to be desired.

THE EDWARD CHAPMAN MEMORIAL PRIZE FOR RESEARCH

Experience of the work of a College Tutor extending over the last quarter of a century has convinced me that a certain amount of research-work is of great use as supplementary to the routine work for the Science Schools, and that in a few instances it is a better form of education than the mere reading of text-books for examination. One cannot generalize for this is essentially a question of individual capacity, and each case has to be judged on its merits. Some teachers however, whose experience has given them cause to doubt whether original work as a method of training is of any value, have not hesitated to deprecate it entirely.

They now have an answer. The men who have been successful as researchers are doing work of importance in the present stress.

In 1910, with the view of commemorating the work of Edward Chapman at Magdalen and of encouraging research in one or other of the several branches of Natural Science among the junior members of the College, the subscribers to the Edward Chapman Memorial Fund founded a Prize to be given for published work in Science. The printed regulations for the prize are bound up with some twenty copies of this volume, and specimen examples of these extra-illustrated copies have been deposited in the Libraries of Magdalen College and of the Royal Society, in the Radcliffe Library, and in certain of the Libraries mentioned by the Copyright Act.

PRIZEMEN.

1912. THOMAS FIELD WINMILL

who presented the papers listed on pp. 259–60, with another on *Asymmetric Quaternary Arsonium Compounds and their attempted Resolution.* *J. C. S.* 1912.

1914. ALAN GORDON HARPER

who presented the papers listed on p. 259.

SCIENTIFIC POLITICS AND POLEMICS

Shapes of all Sorts and Sizes, great and small,
They stood along the floor and by the wall;
  And some loquacious Vessels were; and some
Listen'd perhaps, but never talk'd at all.

DURING the past ten years, three controversial matters, seriously affecting scientific studies, have taken up a good deal of the time of various members of the University. They are—

1. Greek in Responsions. (See p. 193.)
2. The Close-time for Scholarship Examinations.
3. Science in Responsions.

Scholarship Examinations.

The effect of the Close-time Agreement.

The table of Honours (p. 162) further demonstrates the results of a policy which has caused one of the leading scientific colleges in Oxford to shift its open competition for scholarships in Natural Science from a season and from conditions which long experience had shown to be the most favourable, to a time of year which has not been convenient and has certainly not proved a success. Science demyships at Magdalen have had an aggregate money-value of £320, and in some cases of £400 or more.[1] Two and sometimes three of these prizes are offered annually in open competition to candidates under nineteen years of age, but it has happened on many occasions that the examiners have not felt able to recommend candidates for election. To the plain man it would appear that a college offering such valuable emoluments might be permitted to hold the competition under conditions which events have shown to have produced the best candidates.

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[1] By his uniform support of a policy of offering more than one demyship per annum for Science, the present President of Magdalen has gone far to realize the dream of Dr. Daubeny.

'I trust the time is not far distant, when such alterations shall be introduced into our scheme of education as will give *fair play* to the modern sciences, by rendering them integral parts of our system, or at least by holding out to their prosecution encouragements, in the shape of prizes and scholarships, similar to those now afforded to a proficiency in classical, and even in oriental literature; I flatter myself, it will be found, that the faculties of youth will be as much improved by an attentive study of the truths of experimental science, and of those methods of research, by means of which these truths have been arrived at, as they have hitherto been by that of the most approved models of Grecian or Roman Philosophy.' Daubeny, *Atomic Theory*, 1831, p. vii.

But to preserve the *status quo* did not recommend itself to minds bent on remodelling. The schemes at first were drafted exclusively in the classical interest; many of the contracting Colleges and their representatives did not even know that Science would be involved. Various considerations were advanced by the reformers: the examination should be held at a season to suit schoolmasters, some of whom had never sent up a successful candidate;[1] held moreover in a way which no group of Colleges at Cambridge could consider competitive; and at a time convenient to any other College that might be examining with Magdalen: in effect at any time but that which had yielded an unfailing succession of good elections.

It is impossible to admit so many claims, and yet remain true to the interests of College and of Science. Interference with the old method of selection has brought it about that Magdalen is no longer in the position of being able to produce her due proportion of scientifically trained men. The shortage is particularly marked in the case of medical men. Under the new régime medical student demies have been reformed out of existence; and as frequently happens in a school, with the disappearance of the best there has been a numerical falling off in the rank and file. It is a peculiar irony of fate that this, for Magdalen ill-starred reform, should have been made just when our medical school was in so flourishing a condition that Magdalen men gained Radcliffe Travelling Fellowships three years in succession. This was justification enough, were any needed, for letting well alone.[2]

Science in Responsions.

In the last decade the question was mooted as to whether persons coming to the University to study the Liberal Arts should be required to have some acquaintance with elementary natural science.

The subject was brought to a head by a letter of January 21, 1904, from Sir Archibald Geikie and Mr. Larmor, secretaries of the Royal Society, to the Universities, which expressed the strong conviction of the President and Council of the Royal Society that it was in the power of the Universities 'to confer most substantial benefit on the nation' by taking steps to 'ensure that the knowledge of science is recognized in schools and elsewhere as an essential part of general education'.

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[1] Some of the schoolmasters who agitated for the close-time appear to have been in need of the excellent advice offered by Mr. *Punch* to a prominent Head Master, when he in 1915 tried to teach the government how to manage 'Gibs and Kiels and Kaisers', after the defeat of Germany:

Let schoolmasters observe the wholesome rule
Of sticking closely to their job and school.

[2] Some of the results of the present system were stated in a letter entitled *College Scholarship Examinations*, which is appended to the collection of papers at the end of the few extra-illustrated copies of this volume.

Many people had already realized the need for a wider knowledge of elementary science at Oxford, for ignorance of the laws of nature even among some who were considered well educated, was startling.

Memorials were addressed to the Hebdomadal Council of the University to urge the desirability of giving an effectual reply to the letter of the Royal Society by requiring some knowledge of Natural Science in the Entrance examination and in any other examinations which the University might adopt in lieu of the same. One plan was that a compulsory paper on natural science should be subsituted for the arithmetic paper in Responsions; and as complaints had been made of the illiteracy of many of the candidates, it was suggested that the Masters of the Schools should require lucidity and correct expression in the answers.

As the introduction of such an examination into Responsions would be a new departure, for which the teaching in many schools might be inadequate, it was intended that the examination should be easy at first, and that the standard should be gradually raised. When in May, 1906, I was privileged to give evidence before a Committee of Council, I proposed the adoption of a draft syllabus on the following lines,—a selection of matters with which an educated man ought, in my opinion, to be acquainted.

Draft Syllabus for Science in Responsions.

Elementary *astronomical* facts relating to the Solar System, to the Motions of the Earth and to the apparent Motions of Sun and Moon.

Elementary *physiographical* facts relating to Latitude, Longitude and Time; the Seasons; Gravitation; Tides; Atmosphere; Winds; Temperature and Pressure; Ocean Currents.

Mechanics: The Laws of Motion. Levers. Laws of falling Bodies. Boyle's Law. Barometer. Pressure of columns of Liquids.

Heat: Expansion; Thermometry; Transference of Heat by Conduction, Convection and Radiation.

Chemistry of the elements of Air, Water and Carbon dioxide.

Biology: Metabolism and Respiration of Animals and Plants.

The scheme was quashed by the Hebdomadal Council, partly by those who desired no change in Responsions, but partly also it must be said on the representation of one or two scientists in Oxford who declared themselves against what they termed 'smattering', especially in their own department.

A smattering of science may be more useful than many of the quips and cranks which examinees are so frequently told to get up. Numbers of our students ultimately find their way into Government offices, where in control of the practical affairs of the nation their ignorance may and often does do real harm. Indeed the vacuity of some jacks-in-office is evident every day. To give but a recent instance culled from the *Times* of February 2, 1916: when 'Turned-down' wrote to a Government office to suggest that the striking of church bells should be stopped in London because they might guide air-raiders, he received a nicely worded letter to the effect that the authorities did not think such a step necessary. The step was taken months later!

That charcoal or garden soil will absorb gases like chlorine is a fact well known to many who have only a slight smattering of Chemistry. Such knowledge widely spread might have saved many lives from gas-poisoning in the trenches.

What men of learning think to-day, the public will think to-morrow, but sometimes to-morrow is unfortunately a very long way off. We recall with pleasure that as far back as seventy-five years ago, Dr. Daubeny anticipated the strictures in the press of 1916 on the inadequacy of the scientific education of Oxford men. He wrote, February 11, 1840: 'It would be proper . . . to insist on a certain elementary knowledge of the fundamental law of mechanics and of chemistry, if not from every graduate, at least from every one who leaves the University with the sanction of its highest honours. The same principle, in short, which in the sister University denies every kind of literary distinction to those who have not attained a certain amount of mathematical knowledge, ought surely to prevent our sending into the world, furnished with our highest credentials, persons, who for aught we know, might leave us in the most profound ignorance of the nature of Gravitation, and of the constitution of the very Atmosphere which we breathe.'

Roger Bacon had held and expressed similar views, and were he living now would say that without natural science 'nothing worth knowing in philosophy can be attained'.

About 1856 a Committee of the British Association reported:

'It is melancholy to see the number of Oxford Graduates who do not know the elementary principles of a telescope, a barometer, or a steam-engine. The contempt of anything manual or mechanical, which Bacon so strongly reproved, still prevails to a large extent among the upper classes.' The standard is not very different now.

To quote one of Dr. Daubeny's successors in the Chemistry chair, who was contrasting English and German Chemistry: 'There cannot be any doubt that the manufacturer of organic colouring matters during the critical years 1870–80 was, owing to the neglect of organic chemistry by our universities, placed in a very difficult and practically impossible position.'

'If the record of our universities is examined, it is at once obvious that many of those famous places, and more particularly the Universities of Oxford and Cambridge and the Scottish Universities, contributed practically nothing to the advancement of organic chemistry during the latter part of the last century.' Prof. Perkin, *Presidential Address to the Chemical Society*, 1915.

But then we should always remember that the best German brains were available for organic chemistry, whereas a large proportion of ours go out to govern India.

But it should not be thought that Oxford is the only place where scientific studies are less diffused than they should be. According to a *Times* report of January 7, 1915, Mr. J. Young stated that 'Sandhurst had the honour of being the only military college where science was absolutely ignored'.

How conservative is the Army! The same was being said in 1849, when Dr. Robinson in his Presidential Address to the British Association gave the following instance:

'The head of a great military department once said that he hated scientific officers! Any one of his officers could have told him that more money had been wasted and lives lost in that department, from sheer ignorance of science, than any one could think of without shame and sorrow.' In the same Address we read that a general officer is reported to have asked, 'Of what use is science?'

APPENDIX A

THE METEOROLOGICAL RECORD.

> Study, O study the chart in the paper
> Look at the glass and be guided by that!
> GODLEY.

The daily observations of the atmospheric pressure, temperature, and humidity of the rainfall and wind, and of the height and temperature of the River Cherwell have been continued without a break. Indeed, on at least one occasion, lacunae in the meteorological record kept at the Radcliffe Observatory have been filled by a comparison with the Record kept at the Daubeny Laboratory.

Owing to the war the Tables of mean monthly observations are not printed in this volume, but the daily readings may be consulted in the Record books at the Laboratory, and annual summaries of the observations will be bound in with some 20 copies of this book.

The heaviest annual rainfall, 30·86 inches, occurred in 1912, the heaviest fall in 24 hours being 1·76 inches on October 11, 1910.

The highest air temperature recorded was 91⅓° in the shade on 9 Aug. 1911, and the lowest minimum thermometer (exposed) was 4½° on 29 Dec. 1908.

The highest and lowest mean monthly temperatures of the Cherwell were 68·1° for July 1911, and 36·4° for Feb. 1909 and Jan. 1914. The yearly means of the river varied from 52·35° in 1911 to 49·2° in 1912.

The Barometer has again been moved to the practical Physics room on the ground-floor. The correction for sea-level applied to all readings is now +·2, instead of +·221 when the instrument was on the upper floor.

APPENDIX B

RESEARCHES CARRIED OUT IN THE DAUBENY LABORATORY DURING 1903–14; WITH TITLES OF PUBLICATIONS BASED THEREON.

> We may be justified in hoping . . . that the State will recognize in Science one of its elements of strength and prosperity, to foster which the clearest dictates of self-interest demand.
>
> H.R.H. Prince Albert, *Golden Precepts.*

Separate copies of most of these papers have been bound up with 20 copies of this volume.

The results of about a score of earlier researches have been recorded in the *History* of the Laboratory (Appendix B, pp. 48–50).

In addition to the further list of completed researches printed below, we may note that the Laboratory was used for—

The determination of the Electrical Conductivity of Iodic Acid, by Dr. M'Lachlan.

Work preliminary to the measurement of the Specific Resistances of pure anhydrous Acetic Acid, and the two next higher homologues, at their own boiling-points. By Mr. Lambert in vacations of 1904–6.

Experiments on a yellow ether isomeric with the colourless methyl ether of ortho hydroxy meta methyl benzophenone. By Mr. Moore, 1906.

Research on Air-testing Appliances. By Mr. D. R. Wilson, H.M. Inspector of Factories, in 1909.

Mr. Manley also devoted some time to inventing a Splash Guard for the Motor Buses of Oxford, which are a serious nuisance to pedestrians and shopkeepers, when the roads are muddy. The invention proved efficient, and so a Provisional Specification for a Patent, No. 2962 (24 Feb., 1915), was filed. Unfortunately, the invention was found to have been forestalled by Mr. Catling's Patent, No. 7465 of 1912. An annular flap is used for preventing mud from splashing sideways.

1903.

19. **J. J. Manley.** Chlorine Titrations of 162 samples of Sea-Water collected at various depths in the Faeroe-Shetland Channel between May 1900 and June 1902.
Published by H. N. Dickson in *The Hydrography of the Faeroe-Shetland Channel. Geographical Journal,* April 1903; and in *Memoirs of the Challenger Society,* No. 1, pp. 95–6.

20. **J. M'Lachlan.** Hydrogen Peroxide.
Sm. 8vo, Bristol, 1904.

1905.

21. **V. H. Veley and Manley.** The Refractive Indices of Sulphuric Acid at different concentrations.
Proc. Royal Soc. 1905.

22. **N. V. Sidgwick.** Note on the Interaction of Metallic Cyanides and Organic Halides.
Proc. Chem. Soc. p. 120, 1905.

1906.

23. **R. T. Günther.** [Identification of Species of] Porifera. 'The Wild Fauna and Flora of the Royal Botanic Gardens, Kew.'
Kew Bulletin, Addit. Ser. v, 1906.

24. **E. G. Hill.** The Hydrolysis of Ammonium Salts by Water.
Trans. Chem. Soc. pp. 1273–89.

1907.

25. **Sidgwick and Moore.** Zur Dynamik der Tautomerie.
Zeit. für physikalische Chemie, lviii, 3, 385–408.

26. **T. S. Moore.** The Equilibrium in Aqueous Solutions of Amines, pseudo-acids and pseudo-bases, and Lactones.
Trans. Chem. Soc. xci, p. 1375.

27. **T. S. Moore.** The 'True' Ionization Constants, and the Hydration Constants of Piperidene, Ammonia and Triethylamine.
Trans. Chem. Soc. xci, p. 1379.

28. **R. T. Günther.** Die Stellung der Chaetognathen im System.
Zoologischer Anzeiger, xxxii, pp. 71–2.

29. **R. T. Günther.** The Chaetognatha, or Primitive Mollusca.
Quart. Jour. Micr. Science, li, pp. 357–394.

30. **R. T. Günther.** Zoological Results of the Third Tanganyika Expedition, conducted by Dr. W. A. Cunnington, 1904–1905. Report on Limnocnida tanganicae; with a note on the Subspecies from the Victoria Nyanza.

Proc. Zool. Soc.

31. **J. J. Manley.** On the Application of a Differential Densimeter to the Study of some Mediterranean Waters.

Proc. Royal Soc., Edinburgh, xxvii, pp. 210–32.
Cf. Sir John Murray, *The Ocean*, p. 22.

32. **E. G. Hill.** The Electric Conductivity and Refracting Power of Ninety Samples of Sea-Water and a Comparison of these with the Salinity and Density.

Proc. Royal Soc., Edinburgh, xxvii, pp. 233–43.

1908.

33. **Sidgwick and Tizard.** Colour of Copper Salts in Solution.

Trans. Chem. Soc. xciii, p. 187, 1908.

34. **Sidgwick and Tizard.** The Initial Change of the Radium Emanation.

Trans. Chem. Soc. xciiii, p. 957, 1910.

1909.

35. **Sidgwick and Moore.** Rate of Reaction of the Triphenylmethane Dyes with Acid and Alkali. Part II. Brilliant-Green and Malachite-Green.

Trans. Chem. Soc. xcv, pp. 889–98.

36. **Sidgwick and Rivett.** The Reaction of Diaminotriphenylcarbinol with Acid and Alkali.

Trans. Chem. Soc.

37. **J. J. Manley.** Chlorine Titrations of 139 Samples of Sea-Water collected in the N. Atlantic during 1903 and 1904, on board Dr. Wolfenden's Yacht *Silver Belle.*

Published by Wolfenden in *Scientific and Biological Researches in the North Atlantic*, pp. 109–26; *Memoirs of the Challenger Society*, No. 1, 1909.

1910.

38. **Sidgwick.** The Solubility of Organic Acids and Bases in Solutions of their Salts. Preliminary Note.

Proc. Chem. Soc. p. 60, 1910.

39. **Sidgwick and Tizard.** The Colour and Ionization of Cupric Salts.
Trans. Chem. Soc. xcvii, pp. 957–72.

40. **Rivett and Sidgwick.** The Rate of Hydration of Acetic Anhydride.
Trans. Chem. Soc. xcvii, pp. 732–41.

41. **Rivett and Sidgwick.** The Rate of Hydration of Acid Anhydrides, Succinic, Methylsuccinic, Itaconic, Maleic, Citraconic, and Phthalic.
Trans. Chem. Soc. xcvii, pp. 1677–86.

42. **Manley.** Observations on the Anomalous Behaviour of Delicate Balances, and an Account of Devices for increasing accuracy in Weighings.
Abstract in *Proc. Royal Soc.* lxxxiv, p. 389; *Phil. Trans.*, ccx. pp. 387–415.

1911.

43. **Sidgwick, Pickford, and Wilsdon.** Solubility of Aniline in Aqueous Solutions of its Hydrochloride.
Trans. Chem. Soc. xcix, pp. 1123–32.

44. **Sidgwick and Wilsdon.** Conductivity and Viscosity of Aqueous Solutions of Aniline Hydrochloride at 25°.
Trans. Chem. Soc. xcix, pp. 1118–22.

45. **E. G. Laws and N. V. Sidgwick.** Isomeric Acetaldehydephenylhydrazones.
Trans. Chem. Soc. xcix, pp. 2085–93.

1912.

46. **J. J. Manley.** On the Observed Variations in the Temperature Coefficients of a Precision Balance.
Proc. Royal Soc. lxxxvi, pp. 591–600.

47. **J. J. Manley.** On the Apparent Change in Weight during Chemical Reaction.
Abstract in *Proc. Royal Soc.* lxxxvii, pp. 202–4.
Complete paper in *Phil. Trans.* ccxxii, pp. 227–60.

48. **J. J. Manley.** Analyses of Green and Blue Glass from the Posilipan Mosaic.
Archaeologia, lxii, pp. 106–8.
Partly reprinted in Günther's *Pausilypon*, pp. 289–91, 1913.

49. **Moore and Winmill.** The State of Amines in Aqueous Solution.
Trans. Chem. Soc. ci, pp. 1635–76.

50. **Moore, Somerville, and Derry.** The Velocity of Reaction between Potassium Chloroacetate, and some Aliphatic Amines.
Trans. Chem. Soc. ci, pp. 2459–67.

1913.

51. **N. P. Campbell.** On the Application of Manley's Differential Densimeter to the Study of Sea-Waters on board ship.
Proc. Royal Soc., Edinburgh, xxxiii, pp. 124–36.

52. **Wilsdon and Sidgwick.** The Rate of Hydration of Acid Anhydrides: acetic, propionic, butyric, and benzoic.
Trans. Chem. Soc. ciii, p. 1959.

1914.

53. **Moore.** Asymmetric Tervalent Nitrogen.
Proc. Chem. Soc. xxx, pp. 182–4.

1915.

54. **Wilsdon and Sidgwick.** Rate of Hydration of Camphoric Anhydride.
Trans. Chem. Soc. cvii, p. 679.

55. **C. H. Manley.** Chemical Analysis and Refractive Indices of Leamington Spa Water.
[In preparation for publication.]

The papers may be grouped as follows :—

Refractive index of Sulphuric Acid.
No. 21.

Rates of Reaction of Triphenyl-methane Dyes with Acid and Alkali.
Nos. 25, 35, 36.

Equilibrium in Aqueous Solution of Amines.
Nos. 26, 27, 49.

Colour of Copper Salts in Water.
Nos. 33, 39.

Rate of Hydration of Acid Anhydrides.
Nos. 40, 41, 52, 54.

Solubility of Aniline in Aqueous Solution of its Hydrochloride.
Nos. 43, 44.

Differential Densimeter.
Nos. 31, 51.

Accurate Use of the Balance.
    Nos. 42, 46, 47.
Not strictly experimental.
    Nos. 22, 26, 34.
Zoological Papers.
    Nos. 23, 28, 29, 30.
Sea-Waters.
    Nos. 19, 31, 32, 37, 51.

The analyses of sea-waters by the Daubeny Curator have an especial domestic interest, because it is a subject in which Dr. Daubeny was himself greatly interested. On May 22, 1837, and on November 26, 1838, he described an Instrument for obtaining Specimens of Water from considerable Depths, and wrote on the varying Specific Gravity and Saltness of the Sea at different Depths. In modern practice, salinities of sea-waters are computed from chlorine contents by Knudsen's Hydrographical Tables.

In Mich. Term 1915, in the second year of the war, a letter, dated 21 Oct., 1915, was received from the Advisory Council of the Committee of the Privy Council for Scientific and Industrial Research requesting information on researches in progress, and the amount of funds available to meet the expenses connected with them. The answer to the latter question was simple. The Daubeny Laboratory has never had any 'endowment for research'. The cost of the upkeep of the buildings, the rates and taxes and a half-share of the cost of gas, water, and heating have been borne by Magdalen College, but the expense of the greater part of the researches has been borne by persons of slender incomes, whose devotion to their respective sciences would have led them to make greater sacrifices if the opportunity had presented itself. There is no doubt that even a small annual grant in aid of research would have increased the output of original scientific work done in the Laboratory,[1] and in the future 'after the war' private incomes on a revised scale may no longer permit of personal sacrifices.

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[1] It may perhaps be mentioned that in 1903 the Daubeny Laboratory account was able to make a payment of £50 to the Corporate Revenues of

The work of Messrs. Sidgwick and Moore was helped by grants of some £50 (1909–10) from Magdalen College, and by others from the Royal and Chemical Societies. The College also made grants of £10 in 1905 for the work of Mr. Hill, and of £15 in 1909 for that of Mr. Laws.

But Mr. Manley, beyond a box of resistance coils and a platinum-iridium wire obtained by a grant from the Royal Society in 1897, has had no external assistance for any of his numerous and valuable researches, though they have required exceptionally delicate and costly instruments.

In answer to the first question of the Research Council, relating to the researches actually in progress, or carried out in recent years, the following (by J. J. M.) were mentioned :—

1. The composition and manufacture of glass for chemical apparatus.

   This work has been dropped. A method for the manufacture of soft soda glass was almost completed : from this it was proposed to proceed to trials of methods for the manufacture of Jena and of other glasses.
2. Determination of the approximate limits of variation in the electric resistance of the plugs of standard resistance coils, and a device whereby such resistances can be made small and practically constant. (Almost completed.)
3. A new high-speed electric alternator of non-variable resistance. (Almost completed.)
4. Two new forms of pyknometer and a comparison of the relative merits of some pyknometers in general use. (Almost completed.)
5. Determination of the specific heats of certain liquids by a method of cooling, the range of cooling being from one-tenth of a degree to five degrees centigrade.
6. Measurement of the electric constants of exceeding fine platinum wires, together with a new form of platinum

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the College, out of profits made by the course of Physical Chemistry, which had been started with apparatus furnished under a College Order of 1900.

thermometer capable of indicating $\frac{1}{10000}$° C. (Almost completed.)

7. A new precision balance for the accurate determination of the relative densities of gases. The volume of the gas used is from 100–200 c.c. only.
8. A new method for the purification of phosphorus-pentoxide used in connexion with the production of high vacua. (Almost completed.)
9. Some new mercury compounds obtained by an electrical method.
10. A method for the preparation of 100% nitric acid. (Recently commenced: the results are successful from the purely scientific, though not so from the commercial, point of view.)
11. A research conducted with the object of discovering a method for the nitrification of cellulose without the aid of sulphuric acid.
12. Experiments to test Boyle's Law at low pressures.

It is obviously undesirable for a man engaged in successful research to have to go the round begging for funds to enable him to carry on work that he is doing for the common good, and upon which not only the scientific reputation of his University, but in some cases the wealth or safety of the whole country, may depend. Persons who are at all sensitive in these matters simply do not beg, but prefer to leave the work undone. The only satisfactory manner of endowing research is to place a sum of money and leisure at the disposal of the worker for the express purpose of his research, which he may draw upon, with due safeguards, as required.

APPENDIX C

THE COLLECTIONS OF APPARATUS.

> Such as queer-looking bottles and jars in a row,
> Retorts, crucibles, such as all conjurers stow.

The principal acquisitions have been :—

1904. Apparatus for teaching Preliminary Physics purchased from Mr. E. S. Craig when the Physics Laboratory at Keble College was given up.

Physical Apparatus purchased from Mr. F. Jervis Smith when he retired from the Millard Laboratory.

Amsler's Planimeter.

1907. A Fuller's Calculating Slide Rule.

A 100-gramme Standard Weight. By Paul Bunge.

This weight was tested by the Normal Eichungs-Kommission at Charlottenburg on Oct. 1, 1907. Its mass was certified to be 100 grm. —·04 milligrm. (correct to the nearest $\frac{1}{100}$ milligrm.). Volume at 0° was 4·64 ml. Its official mark is K. N. E. K. $\frac{27}{07}$.

This weight has a particular value because not only have Mr. Manley's own refined weighings been made with weights standardized by it, but also the weights used by Messrs. Appleby, Baker, Hartley, Moore, Rivett, and Sidgwick in their recent researches have all been standardized by comparison with the same standard. So that practically most of the accurate weighings made in Oxford in recent years depend upon this 100-gramme weight.[1]

This same weight has also acquired Imperial importance by being the parent of standards used

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[1] An article in the *Daily Graphic* for June 26, 1913, quotes Lord Kelvin to the effect that 'nearly all the grandest discoveries of science have been the reward of accurate measurements and patient, long-continued labour in the minute sifting of numerical results', and mentions, with approval, as examples, the work of the National Physical Laboratory, of Prof. Hecker at Potsdam, of Boys, the Earl of Berkeley, and Manley at Oxford.

in the British Dominions beyond the Seas, for a set of weights now used in the University Laboratory at Melbourn was standardized by comparison with this weight by Mr. Rivett.
'Omega' Stop-watch Chronometer.
Metre Bridge with Platinum Iridium Wire.
1910. Short-beam Balance by Bunge.
Two copper Thermostats.
A set of Paul's Manganin Resistance Dial Coils.
$\frac{1}{10}$th Horse-power Electro-motor and fittings.
4 Accumulators.
1903, Nov. 13. Permission to obtain duty-free spirit was obtained from the Inland Revenue authorities, Somerset House.
1911. A Screw-cutting Lathe, deposited on loan by Mr. H. W. M. Willett has been a most valuable acquisition in many ways.

Loans.

An accumulator was lent to the late Dr. Jenkinson at the Museum. (Returned.)

Two polarimeters are on loan to Prof. Moore at Holloway College.

A quantity of mercury was lent to H.M. Inspector of Factories, Mr. D. R. Wilson. (Returned.)

Stop-watch and Slide Rule are on loan to Mr. Sidgwick.

Chemical Glass.

Among the apparatus which Dr. Daubeny bequeathed to Magdalen there is a good deal that carries us back to the chemists of a very early period, indeed some of the larger and coarser of these old pieces almost suggest the alchemist's cellar; certainly they would be more in keeping with it than with the delicate glass-work of present-day laboratories with their modern fittings-de-luxe for gas, electric current and high pressure water. True Dr. Daubeny left us no black cat, or stuffed crocodile pendant from the ceiling, but of earthenware retorts, clay crucibles, alembics, and other distillatories there are plenty. And we owe it to the bountiful supply of cupboards and out-of-the way hiding-places which he provided to his building that all this old glass-ware has escaped breakage.

The provenance of the individual pieces in this miscellaneous collection is doubtful, nevertheless they lead our thoughts back through the epochs of Sir Humphry Davy, of Priestley and Lavoisier, perhaps even to the great days of Boyle and of Mayow, the discoverer of oxygen.

Part of the collection of old glass is now displayed in show-cases.

In many modern schools of Science a knowledge of the development of practical methods, of the construction and use of appliances and apparatus, and of the mechanical means whereby advance has been effected, have formed for some time an essential part of a proper scientific education.

Later investigators can never completely follow the work of their predecessors, without an exact knowledge of the materials and the methods employed by them. Book descriptions seldom do full justice to the difficulties of the work of pioneers.

Early instruments for physical experiments that are of sentimental interest, of fine workmanship, or of artistic merit, are treasured in many cabinets in the centres of learning of Europe, and many are still in working order. But in Chemistry the conditions of research are so different that the demonstration of early chemical methods with contemporaneous apparatus and materials is by no means easy.

With what interest chemists of the present day would visit the laboratories of Lavoisier, of Cavendish, or of Priestley, if we had them with all their apparatus intact. Even the mysterious achievements and unintelligible gibberish of the alchemists would become clear if we could analyse their materials anew, and translate their formulae into our own language.

But chemicals and reagents flow through a chemical laboratory like water in a river, the soiling and breakage of glass-work and crockery is incessant, metal-work corrodes, and parts of apparatus, that have served a turn but are now worn out are continually being refashioned into new. Even glass vessels suffer a peculiar degradation that renders them unfit for their purpose. And thus it was found, when an attempt was being made to form a national collection of scientific apparatus at South Kensington, that glass-ware used by early chemists was exceedingly rare, and that samples of their reagents and preparations are wellnigh unobtainable.

To illustrate the progressive history of Science no one collection will ever be sufficiently comprehensive; it is therefore essential that all early oddments of apparatus scattered about the country, should, by being listed, be made accessible to students. With this intention the following reprint of the explanatory labels referring to some of the early chemical apparatus in our Laboratory is appended.

Apparatus for the Production and Application of Heat.

The French fourneau à réverbère. c. 1818.

Known in Germany as Becher's Furnace. Thénard, *Traité de Chimie*, Pl. vii, 1818.

Cooper's Tube Furnace for the Analysis of Organic Bodies. c. 1828.

Combustions were effected in glass tubes coated with a spiral wrapping of copper foil. Gray, *Operative Chemist*, p. 295, fig. 178, 1828.

Combustion Tube of Berlin Porcelain, for use with ditto.

Newman's Blowpipe. 1816.

Designed to obviate the difficulty of blowing with the mouth. It was used with compressed gases as the first oxy-hydrogen blowpipe.

Gurney's Oxy-hydrogen Blowpipe. 1823.

Gray, *Operative Chemist*, p. 103, fig. 64.

Distillation.

Retorts.

Retort of Berlin Porcelain, with loose head to be fixed with wire and cement, for the preparation of Ammonia, &c. Griffin, *Chemical Handicraft*.

Retorts of Yellow glazed Stoneware. One Plain. Two tubulated. c. 1828.

'For dephlegmating oil of vitriol, distilling ether, and many other such occasions, the retorts may be made of the substance of which the pots, &c., commonly called stoneware, are formed.

'They may be obtained at the stone manufactories, at an expense but little exceeding that of glass; and they afford by their durability a great saving compared to glass, where much business is done.'

Gray, *Operative Chemist*, p. 274, 1828.

Retort of Green Glass, tubulated.

'For ordinary purposes, retorts of green glass are used, either placed in baths, or coated and used in a naked fire; but for some purposes flint glass retorts are obliged to be used.' Gray, *Operative Chemist*, p. 274, 1828.

'In consequence of the excellence and present cheapness of the Retorts made of hard white German and Bohemian glass, those of green glass have been omitted from the Catalogue.' Griffin, *Chemical Handicraft*, No. 1805.

Retorts of French Fireclay with long tubulures.

Cornues en grès vernis de la fabrique d'Orléans.

Griffin, *Chemical Handicraft*, No. 1834.

Pear-shaped Bodies with ∽-shaped tubular Receivers of thick glass.

RECEIVERS.

∽-shaped tubular Receivers of thick glass.

ADAPTERS.

'In some simple distillations it is necessary to interpose an adapter between the retort and receiver. This may serve two different purposes; either to separate two products of different degrees of volatility, or to remove the receiver to a greater distance from the furnace, that it may be less heated.' Lavoisier, *Elements of Chemistry*, *Kerr's Translation*, p. 464, 1793.

ALEMBICS.

Two Alembic heads with ground stoppers.

One Alembic head and body complete.

'Les Alambics de verre sont formés de deux parties, de la cucurbite et du chapiteau. Ils s'emploient ordinairement au bain de sable.' Thénard, *Traité de Chimie*, 1818.

'The capital, both of the cucurbit and alembic, has a furrow or trench intended for conveying the condensed liquor into the beak, by which it runs out.

'As in almost all distillations, expansive vapours are produced, which might burst the vessels, we are under the necessity of having a small hole in the balloon or recipient through which these may find vent; hence in this way of distilling, all the products which are permanently aëriform are entirely lost, and even such as difficultly lose that state have not sufficient space to condense in the balloon; this apparatus is not, therefore, proper for experiments of investigation, and can only be admitted in the ordinary operations of the laboratory or in pharmacy.' Lavoisier, *Elements of Chemistry*, *Kerr's Translation*, p. 462, 1793.

Apparatus for Fractional Distillation.

The body provided with a tubulure at the side and a head is followed by three double-necked and quilled receivers fitted one to another in a horizontal series. The distillate is received in the three flasks placed under the receivers. Receivers of this type were described by Peter Woulfe in the *Philosophical Transactions* for 1767 for condensing the vapours of nitric acid.

Apparatus for Fractional Distillation, known as the 'Hydra'.

Similar to the last, but the recipients are arranged vertically.

Compound Distillatory Apparatus of Hassenfratz.

'This apparatus "is calculated for the most complicated distillations, and may be simplified or extended according to circumstances." It consists of a tubulated glass retort, a tubulated balloon or recipient, and two or three bottles with three necks; the farthest neck of the last bottle is connected with a jar in a pneumato-chemical apparatus. "The juncture between the retort and the recipient must be luted with fat lute, covered over with slips of linen, spread with lime and white of egg; all the other junctures are to be secured by a lute made of wax and rosin melted together."' Lavoisier, *Elements of Chemistry*, *Kerr's Translation*, p. 468, 1793.

The glass tubes in the middle necks of the bottles were suggested to Lavoisier by Mr. Hassenfratz as a means of avoiding the disaster occasioned by the water in the cistern of the pneumato-chemical apparatus rushing back into the last bottle whenever a small diminution in the heat of the furnace occurs.

APPARATUS FOR THE PREPARATION AND EXAMINATION OF GASES.

Dr. Priestley's Apparatus for collecting the elastic fluids which are evolved when metals dissolve in acids with effervescence.

The chief inconvenience of this apparatus is that in many cases effervescence begins before we have time to cork the bottle properly, and some gas escapes, by which we are prevented from ascertaining the quantity disengaged with rigorous exactness.

Lavoisier's Apparatus for Metallic Dissolutions.

'To remedy this, Lavoisier at first used a bottle with two necks into one of which the glass funnel is luted so as to prevent any air escaping; a glass rod is fitted with emery to the funnel, so as to serve the purpose of a stopper. Pl. vii. fig. 3.' Lavoisier, *Elements of Chemistry, Kerr's Translation*, p. 476, 1793.

Apparatus for Class Experiments with Gases.

Detonating Bottle of very stout glass.

Three Glass Cylinders of stout glass, with funnel mouths.

Graduated Gas Tubes.

Eudiometers.

'The glass of which some of these early forms of detonating tubes is made is extremely thick to enable them to withstand the explosion; but "the difficulty of preparing and annealing the instrument is such that it is rare to find one that remains sound for any length of time. It sometimes happens that after an instrument has been made for months, it suddenly explodes without being touched."' Griffin, *Chemical Handicraft*, No. 2342.

APPARATUS USED FOR ANALYSIS.

Test glasses. Conical shape, thick glass. Broader at base than at mouth.

Test glasses. Conical shape without stem.
Griffin, *Chemical Handicraft*, Shape No. 2412.

Test glasses. Clark's conical pattern with stem.
Griffin, *Chemical Handicraft*, Shape No. 2410.

Marsh's Arsenic Test Apparatus.

A tube with two bulbs is fitted with a brass stopcock and jet and is supported upon a mahogany stand.

Sir H. Davy's Apparatus for estimating the quantity of calcium carbonate in soils. 1814.

A. Bottle for receiving the soil.
B. Bottle containing muriatic acid, furnished with a stopcock.
C. Tube connected with a flaccid bladder.
D. Bottle for containing the bladder—filled with water.
E. Graduated measure.

When the stopcock is turned, the acid flows into A, and acts upon the soil; the elastic fluid generated passes through C into the bladder, and displaces a quantity of water in D equal to it in bulk, and this water flows through the tube into the graduated measure: and gives by its volume the indication of the proportion of carbonic acid disengaged from the soil; for every ounce measure of which two grains of carbonate of lime may be estimated. *Elements of Agricultural Chemistry*, 1814, p. 167, fig. 15.

THERMOMETER.

Original Six's Thermometer. 1794.

J. Six, *Construction and Use of a Thermometer.* 4 pls., 8vo. Maidstone, 1794.

OTHER COLLECTIONS.

The Collection of **Minerals** has been registered, labelled, and arranged in 4 cabinets of 24 drawers each. It consists of 1,169 specimens.

A large collection of the 'tops' of Alpine peaks was presented by the Rev. W. A. B. Coolidge, Fellow of the College, and is greatly treasured as the memorial of a work unique among the achievements of Fellows of Oxford Colleges.

Mr. Günther has also housed a part of his own private Collections in the Laboratory Building. And a relief map of the Volcanoes of the Phlegraean Fields was completed under his direction in 1906 (College Order, Dec. 13, 1905). This model was used in illustration of Lectures at the Royal Institution.

Two Rock-specimens collected by Charles Darwin in S. America during the Voyage of the *Beagle* were exhibited in the Examination Schools on the occasion of the Darwin Centenary Celebration in Oxford in 1909.

APPENDIX D

ADDITIONS TO BIBLIOGRAPHY OF DR. DAUBENY.

(See p. 53 of *History*.)

1837. Botanic Garden. An unsigned article in Ingram's *Memorials of Oxford.*

1849. Nov. 19. Testimonial to E. H. Hansell, candidate for Head-mastership of Rugby.

1850. Oxford Botanic Garden, a popular Guide to the Botanic Garden, &c. 8vo.

1853. Ditto, 2nd edit. 1*s*.

1856 & 1864. Supplements to ditto.

1867. *Obituary notices* in *Gardener's Chronicle*, 21 Dec.; *Medical Times and Gazette*, 21 Dec.; *Eyes and no Eyes*, by W. Tuckwell, Taunton, 1 Jan. 1868, repr. in *Oxford Chronicle*, 25 Jan. 1868.

APPENDIX E

REGISTER OF NAMES OF PERSONS WHO HAVE ATTENDED THE CHEMICAL LECTURES OF DR. DAUBENY.

These names, additional to those printed in the History of the Laboratory, pp. 91–102, *have been found in a Register of Attendance, now accessible by the courtesy of the Keeper of the University Archives.*

1853. Lent. **Coulthurst, Nicholas.** Magd. H. Matric. 1851. Settled in Quebec.

James, Charles Deere. Exeter. B.A. 1854.

Rowe, Samuel Nicholas. Worcester. B.A. 1854.

Brook, James. Worcester. Vicar of Southborough, 1871.

Chaplin, Edward Morland. Magd. Hall. Rector of Chilton, Berks., 1857.

Dudding, Henry Swan. Magd. Hall. Rector of Stanton All Saints, Suffolk.

Newnham, Philip Hankinson. Wadham. IV Lit. Hum. '53. Vicar of Maker, Cornwall, 1875. F.R.Met.S. †1888.

Hewett, William Henry. Magd. Hall. Minor Canon, Carlisle, 1861–3; Vicar of Scarle, Notts. 1871.

Morgan, Arthur Middlemore. Exeter. Rector of Huish, N. Devon, 1872–84; Vicar of Mucking, Essex, 1884.

Wilson, Sir Charles Rivers. Balliol. Comptroller General of National Debt Office 1874; Finance Minister, Egypt, 1879. K.C.M.G. 1880.

Robinson, Francis Edward. Exeter. Vicar of Drayton, 1878.

Wickham, William. New Inn Hall. Bar.-at-law, I.T. 1857. High Sheriff of Hants, 1888. Edited 'Correspondence of the Right Hon. William Wickham', 1870.

1853. **Law, Alexander Patrick.** Corpus. M.A. from New Inn
Mich. Hall, 1860.

Whigham, David Dundas. Oriel. M.A. 1857.

1854. **Hasler, William Wyndham.** Ch. Ch. J.P. of Alding-
Hilary. bourne, Sussex.

1855. **Hart, Thomas Aubrey.** Magd. Hall. M.A. 1861.

Lent. **Thomson, John.** Exeter. Of Woodperry House, Oxon. J.P.

Hughes, Hugh Robert. Exeter. Bar.-at-law, 1859. Major 3rd Batt. R. Welsh Fusiliers, 1872–83.

Alexander, William Henry. Pembroke. Bar.-at-law, I.T. 1860.

Trevilian, Edwin Brooke (Cely). Balliol. Bar.-at-law, I.T. 1863. Of Midelney Place, Somerset. J.P.

Hill, Joseph. Worcester. Rector of Monnington, co. Hereford, 1864–74; of Wimblington, 1874.

LECTURE ON AGRICULTURAL CHEMISTRY.

Additional Names.

1855. **Smith, Algernon Emerick Clementi.** Worcester. Vicar
Mich. of Coatham, Yorks. 1870–4; Rector of Chadwell St. Mary, 1879.

Barnwell, John Clement. Worcester. M.A. 1860.

Morgan, Samuel Christopher. Wadham. D.D. 1881. Vicar of Aldershot, 1864–9; of St. Mary's, Leamington. 1884.

Craig, Alain Tudor. Wadham. IV. Math. M.A. 1861. In Holy Orders.

Aldworth, John. Worcester. P.C. of Haigh, co. Lancs., 1863–†1870.

Phipps, Pownall William. Pembroke. Rector of Upton Slough, 1873–86; of Chalfont St. Giles, 1886.

Woodbridge, Henry William. Pembroke. Bar.-at-law, Lincoln's Inn, 1860.

1856. **Johnston, John Lindsay.** Corpus. Bar.-at-law, Linc. Inn
Hilary. 1861.

Rhoades, Edward James. Pembroke. Vicar of Elmley Castle, co. Worc., 1878.

APPENDIX F

And lands that stretch with endless span
From east to west, from south to north,
Are often much more trouble than
They're worth. GODLEY.

LIST OF GEOGRAPHICAL WRITERS, MEMBERS OF MAGDALEN COLLEGE

Magdalen had been founded too late to contribute a scholar to that small band of Balliol men, who crossed the Alps into Italy soon after the middle of the fifteenth century. One of their principal objects was no doubt the study of medicine, perhaps under the celebrated Guarino Veronese of Ferrara. The best known of them, John Free of Bristol, wrote, when at Padua, a Cosmography, the MS. of which is now in the Balliol Library.

Edward Wotton, M.D., of Padua, must have been one of the first members of Magdalen whose scientific work was markedly influenced by foreign travel and by a sojourn at a foreign University.

Most of the geographical or topographical works of the undermentioned authors are in the College Library.

Cosmography: Peter Heylin

EUROPE:

BRITAIN:
- Camden
- Childrey
- Druce (*Oxfordshire*)
- Homer (*W. Highlands*)
- Jenkins (*Roman Sites*)
- Millard, J. E. (*Basingstoke*)
- Miller, H. (*Ashbury*)
- Ogilvie
- Schomberg (*Bagley*)
- Wade (*Exmoor*)

FRANCE:
- Best
- Daubeny (*Auvergne*)

NORWAY, SWEDEN, & LAPLAND:
- Brooke

SPAIN:
- Ashley
- Brooke
- Graves

SWITZERLAND, &c.:
- Coolidge

ITALY:
- Addison
- Best
- Daubeny
- Drake
- Graves
- Günther
- Symonds, J. A.

SICILY, MALTA:
- Abrahall
- Dryden

GREECE:
- Chandler
- Senior
- Symonds

TURKEY, ASIA MINOR, LEVANT, &c.
- Cartwright
- Chandler
- Graves
- Hogarth
- Myres
- Roe
- Senior
- Smith, T.

PERSIA:
- Cartwright (c. 1611)
- Günther (1898)

INDIA:
- Roe (1592)

BORNEO:
- Moulton

COCHIN CHINA:
- Ashley (translator)

CHINA:
- Clementi
- Johnston, R. F.

MOROCCO:
- Brooke
- Ogilvie

CENTRAL AFRICA:
- Neave

NORTH AMERICA:
- Daubeny
- Miers (*Klondyke*)
- Ogilvie

AUSTRALIA:
- Dutton
- Roth

ANTARCTIC:
- Madigan (*Mawson's Expedition*) (*Report in preparation*)

GREEK IN RESPONSIONS.

(See p. 167.)

In 1904 at the height of the Greek controversy at Oxford, several men of Science, whose opinions will still carry weight with most people, wrote to me privately on the subject. I am sure that they would not mind their opinions being reproduced now. In justice to, I believe a majority of, the scientific Professors of Oxford, it should be stated that their views were opposed to those of the four Presidents of the Royal Society quoted below. Without wishing to appraise the scientific merits of the two parties, these authorities are quoted because they confirm my own opinion, that Oxford and Cambridge men should be of a wider learning than the students from the new technological institutes, now called universities. To attain to the broader outlook, our graduates must study their subject from the historical and philosophical as well as from the practical standpoint.

Lord Avebury.

'I think a slight knowledge of Greek, so much for instance as to understand the derivations of words derived from that language, and to read, if only with the help of a dictionary, easy Greek authors is very desirable. I would not however attempt more in the case of Science degrees. It seems to me also most important that some knowledge of Science should be required in the case of classical degrees.'

Sir William Turner.

'As scientific nomenclature is largely based on Greek, a knowledge of the elements of that language is useful as assisting in the comprehension of the terms employed in scientific description.'

Lord Lister.

'In my opinion an elementary knowledge of Greek should be required of all candidates for Science degrees; but anything beyond that should be optional, not compulsory.'

Sir William Huggins.

'I consider Greek so important as a means of culture that I should regret to see it cease to be compulsory. It seems to me the case might be met by improved methods of teaching Latin and Greek, and by the examination in Greek being less severe in the case of science men.'

Lord Kelvin.

'I believe the knowledge of Greek required for the "Little-go" at Cambridge, though small, is exceedingly useful to science students in after life. I think the Universities of Oxford and Cambridge should continue to require a moderate practical knowledge of Greek of all their graduates; while arranging that for science students it should not damagingly interfere with their other studies.'

Sir Archibald Geikie.

'I would greatly regret to see Greek eliminated from the education of scientific undergraduates.'

Lastly I will quote from a letter from a member of Trinity College, a thoroughly practical man of affairs, who had taken a Poll-degree at Cambridge. His view will appeal to many.

'We owe more than we think to Greek, and it is only a fool's argument to say we have forgotten the little we know. I never knew very much, and have forgotten most of that; but my Euclid and Algebra are in the same case. I am sure I could not write out Euclid i. 48 for instance with reasonable correctness, nor could I do a quadratic equation. If the "ergo" of this is "abolish them", where are you going to stop?' (*Eustace Neville Rolfe.*)

IN MEMORIAM:

CHARLES HERBERT GEORGE MARTIN, M.A., F.Z.S.

WAR is no respecter either of personality or promise. By the untimely death of Lieutenant CHARLES HERBERT GEORGE MARTIN, of the 3rd Monmouth Regiment (T. F.), reported on May 4, at the age of 34, science loses one of the most loyal and painstaking of her younger workers, one whose work augured a distinguished career. Like so many who have fallen in this war, he was an only son. His father was a man of mark, Mr. Edward Pritchard Martin, for some time manager of the Dowlais Iron Works and later a leading ironmaster of South Wales. His mother, the daughter of Mr. Charles Herbert James, for some years M.P. for Merthyr Tydfil, was first cousin of the President of Magdalen, and when "Charlie" Martin left Eton in 1900, it was natural that he should come to that College. As a boy he had shown himself a keen field-naturalist and, being fortunately able to choose his career, he decided to pursue Zoology and studied under Mr. R. T. Günther, his tutor at Magdalen, and Professors Weldon and Bourne.

Of an original and very independent turn of mind, he followed his own line rather than that of the Zoology School, in which, however, he took a Second in 1904. But he was the real student who develops after, rather than before his degree. None who knew him in Oxford will ever forget his unconventional, apparently irresponsible but lovable personality, his enthusiasm for the things that mattered and his tenacious grip of his own point of view. When the College Beagles were started, it was Martin who not only superintended the construction of kennels, but also, taking a shovel, mixed and turned over the heavy concrete for the floor. Yet in some things the practical details of life were irksome to him. He could not be tied by Greenwich time, and consequently he was not always successful in catching a train or in keeping an engagement, scientific or social.

After the Schools he became interested in a variety of subjects, but owing to a diffidence in his own powers and to a dislike of writing some years elapsed before his first serious contribution to knowledge was completed and published. This was on the Thread-cells of the Turbellaria, a line of research in which his great friend G. H. Grosvenor, of

New College, had also been engaged before his premature death. In 1905 Martin stayed up to work at Oxford, and in the summer co-operated in the Survey of the Freshwater Lochs of Scotland under Sir John Murray, who thought well of his powers. In 1906 he was awarded the Biological Scholarship at the Zoological Station at Naples, where he became a *persona grata*. The late Dr. Anton Dohrn remarked to the present writer, " So many of our visitors come once and no more, but Martin is one of ourselves."

During the ten peaceful years that have passed since Martin took his degree (and how short a time it seems!) he had acquired a wide reputation among specialists for the soundness of his work in the most difficult of all biological investigations, the study of the structure and life-history of those low and minute forms of animal life whose vital processes are almost beyond the limits of microscopic vision. Commencing with work on the Acinetaria in 1909, he passed on to the yet smaller Trypanosomas, Trypanoplasmas, and to other pathogenic protozoa, swarms of which infest the bodies of other animals to the great detriment of their hosts, and are in the forefront of the battle between Science and Disease. Later he discovered and attacked the remarkable Flagellate Protozoa that lurk in "Sick Soils," a matter of very great importance to agriculturists and horticulturists. He threw new light on their life by his papers in the *Proceedings of the Royal Society* for 1912, and again, in co-operation with Lewin, in the *Philosophical Transactions* for last year. Further details on the same subject were published by him in the German journal, the *Zoologischer Anzeiger*, and his most recent communication, on Thread-cells, also appeared in another scientific journal of that misguided nation, shortly before the outbreak of the War.

In 1909 Martin was acting as Assistant to the Professor of Zoology at Glasgow, but in the following year all thoughts of teaching were supplanted by the responsibilities that devolved upon him when, in consequence of his father's sudden death, he came into a considerable property and a country-place in Monmouthshire—The Hill, Abergavenny. There he threw himself into the duties of a country life and entered into its pleasures. His friends hoped that he might eventually find, either at Reading or at Oxford, a half-way house between the Lister Institute in London and his Welsh home, and that he would combine the researches of a Laboratory Naturalist with the Mastership of the Crickhowell Harriers.

Two at least of the German officials of the Stazione Zoologica of Naples, Reinhard Dohrn, the present Director, and Gast, enjoyed their first experiences of an English country house under his hospitable roof. The first-named was on a visit to this country in the year of the Darwin Centenary gathering at Cambridge.

For Martin bade fair to be in his generation one of that type to which English science owes so much, the gentleman of independent means who pursues it for its own sake and at the dictates of natural predilection and passion—the type of Boyle and Cavendish, of Darwin and Romanes, Lubbock and Lilford. None of those who were privileged to know him at Oxford will forget him: his name will be remembered and honoured by specialists in more than one branch of science.

As to his soldiering, his was no sudden or late response. He had joined the O.T.C. at Glasgow University and worked hard with it. He was in command of the Machine-Gun Section when he was killed by shrapnel. "Always cheerful, his face ever one broad smile"; so a brother officer described him.

He married, in 1912, Beatrice Elise, daughter of Ferdinand Hanbury, Esq., and leaves, as his friends are glad to think, an infant son.

[H. W. and R. G. in the *Oxford Magazine*, May 14, 1915.]

Biological science has to deplore the death of Mr. C. Martin, who was killed recently in the fighting near Ypres. Mr. Martin was one of the most promising of the younger English men of science, and his work already published showed that he was an investigator of a very high order. . . . On his return to England he took a post for a time in the zoological laboratory of the University of Glasgow, but relinquished it in order to work in a private laboratory which he had installed at his home, The Hill, Abergavenny. His previous studies of the life-history and structure of the protozoa had prepared him for playing a leading part in the important investigations into the soil-protozoa, which investigations had assumed a great importance owing to the work of Russell and his colleagues at Rothamsted. Into this work Martin threw himself with an ardour which his casualness of manner could not conceal. He designed ingenious methods for the isolation and collection of soil organisms, and would, had he lived, have accomplished great work in soil protozoology. For Martin had a sound, penetrating, and critical mind, and, though erratic and exasperatingly elusive in his ordinary life, was patience personified when he exchanged the hunting saddle, which he loved, for the seat in his laboratory, which he loved no less.

His friends were often baffled by his unusual attitude to life, which was that of a great healthy youth full of the spirit of adventure and refusing to be trammelled by conventions and accepted standards. There was nothing commonplace in him, and the mask of carelessness which he was amused to wear concealed a noble seriousness of purpose and was but an aspect of that complex quality of genius which he undoubtedly possessed. Martin's most recent work was done in part at Abergavenny and in part at Rothamsted. In the latter place Dr. Russell, though for the ordering of his laboratory he may at times have wished for a more ordinary type of researcher, was fully alive to Martin's conspicuous merits, and recognized his great and growing abilities. In truth Martin was always a boy, lighthearted and jolly and lovable, and he brought into the somewhat tired air of laboratories a breath of the open. He had the spirit of the pioneer with the mind of the savant. Research was a great quest to which he had devoted his life. But other adventures claimed him. Always actively interested in military affairs, he joined the Artillery at the outbreak of war, and now he has fallen. In the hearts of his friends his death leaves a great void which must always remain. They will continue their plodding course without the hope that on this day or that, when least expected, that tall figure would come bursting into the laboratory, and after a bout of friendly chaff settle down to discuss some big problem of biology, intent on pursuing truth and advancing knowledge.

[F. KEEBLE, in the *Gardeners' Chronicle,* May 15, 1915.]

An Appreciation.

The first of our citizen officers to fall. Poor Charlie! The most peace-loving soul that ever breathed—cheery and kind always, but away behind a will of iron. Whatever road he thought was right, that road he went; and so when duty and his country called he had to go. Straight as a die, a real gentleman, and a sportsman; willing to take on anybody at anything; never acknowledging defeat, always a cheery laugh and some quaint half-humorous remark to show that next time luck would change. Thus, I am sure, he died—game to the last. Facing the foe unbeaten; a gallant gentleman loved alike by officers and men; a loss to science; a loss to his regiment; a loss to his town and his friends. They know well what they have lost. God rest his soul.

[ONE WHO KNEW HIM, in the *Abergavenny Chronicle,* Friday, May 14, 1915.]

[Another notice appeared in *Nature,* May 13, 1915.]

Note on Work at Glasgow.

Charles Martin was appointed Demonstrator of Zoology in the University of Glasgow at the beginning of the Winter Term, 1907, and remained with us until, in 1911, his private affairs required him to take up residence in the south. During this period he took his full share in the strenuous work of teaching the large medical classes in elementary Zoology, but this by no means exhausted his energies, and each evening after the last batch of students had been got rid of, shortly after five o'clock, he would take off his coat and settle down to a long evening's work at research. During these four years he produced a series of admirable papers, some nine in all, most of which were published in the *Quarterly Journal of Microscopical Science.*

Martin's work was characterized by faultless technique, by skill in observation, and by unwearying pertinacity in worrying out the problem before him. But what impressed one most was his very remarkable intellectual power and "grip," combined with the gay light-heartedness of the best type of investigator, who does not take himself and his problems too seriously, but looks rather on his efforts to wrest her secrets from nature as a great game. Martin was much loved and admired by his colleagues, and his loss has thrown a gloom over the laboratory which it will take long to get rid of.

In addition to his laboratory work he held a commission in the O. T. C. and was one of its most popular officers.

[Professor Graham Kerr.]

APPENDIX G

Whose praise do they mention?
  Of what is it told?—
What will be for ever;
  What was from of old.

LIST OF TREATISES ON SCIENTIFIC SUBJECTS BY MEMBERS OF MAGDALEN COLLEGE

1458–1850.

Before the Erection of the Daubeny Laboratory.

1552. **Wotton, Edward.**

De differentiis animalium. fol. Paris, 1552.

A part edited by Tho. Moufet appeared in 1634 under the title Insectorum sive minimum animalium theatrum.

Wotton was the first Fellow of the College of Physicians to bring Zoology into the list of subjects on which a physician should be informed. (Norman Moore, *Hist. of Medicine.*)

1559. **Peter Morwent.**

The Treasure of Evonymus, conteyninge the wonderfull hid secretes of nature, touchinge the most apte formes to prepare and destyl medicines for the conservation of health. Trans. from the Latin of Conrad Gesner.
4°, London. Rep. 1565 and 1575.

1639. **Chilmead, Edmund.**

Translated Hues and Pontanus' 'A learned treatise of the globes, both coelestial and terrestrial, with their several uses'.
8°, London, 1639.

1654–8. **Trapham, Thomas.** M.D. Caen.

A Discourse of the State of Health in the Island of Jamaica.
8°, London, 1679. Noticed in *Phil. Trans.* No. 141, p. 1030.

1660. **Capell, Daniel.**

Tentamen medicum de Variolis, circ. 1660.

1661. **Childrey, J.**

Britannia Baconica. Or, the Natural Rarities of England, Scotland and Wales. According as they are to be found in every Shire. Historically related, according to the Precepts of the Lord Bacon; methodically digested; and the Causes of many of them Philosophically attempted. With Observations upon them, and Deductions from them, whereby divers Secrets in Nature are discovered, and some things hitherto reckoned Prodigies, are fain to confess the cause whence they proceed. *Usefull for all ingenious men of what Profession or Quality soever.* London, 1661.

'On the descent of *Hedddenton* hill near *Oxford* rises a spring, which runs down towards Kingsmill, a mill so called, lying over against *Magdalen* Colledge. It is reported, that this spring hath a petrifying quality, and will in some short time, if a stick be laid in it, either turn it into stone, or wrap it in a stony crust.'

1672. **Drope, Francis.**

A short and sure Guide in the practice of raising and ordering Fruit-trees. 8°, Oxford, 1672.

1672. **Sherley, Thomas.** M.D. Magd. Coll. School, 1645.

A philosophical essay declaring the probable causes whence stones are produced in the greater world. 8°, London, 1672.

Cochlearia curiosa; or the curiosities of scurvy-grass. 8°, London, 1676.

[c. 1729. **James Fynes.**

'The Method of finding a meridian line by shadows improved to a greater success'. Bradley MSS. vol. 47.]

1748. **Knight, Gowin.** Librarian of the British Museum. A 'famous maker of strong Magnets', by a secret process, for the Admiralty. He was awarded the Copley Medal in 1747 for curious experiments with natural and artificial magnets, and in the following year published

'An attempt to demonstrate that all the Phenomena in Nature may be explained by two simple active principles, Attraction and Repulsion: wherein the attractions of cohesion, gravity and magnetism, are shown to be one and the same, and the phenomena of the latter are more particularly explained.' 4°, London, 1748, and 2nd edit. 8°, 1764.

His Battery of Magnets was presented to the Royal Society by Dr. John Fothergill in 1776, and was rearranged by Capt. Beaufort in 1828.

1751. **George Horne.** President, 1768.

The theology and philosophy in Cicero's *Somnium Scipionis* explained; or a brief attempt to demonstrate that the Newtonian system is perfectly agreeable to the notions of the wisest ancients, and that mathematical principles are the only sure ones. 8°, London, 1751.

A fair, candid and impartial state of the case between Sir Isaac Newton and Mr. Hutchinson. In which is shown how far a system of physics is capable of mathematical demonstration; how far Sir Isaac's, as such a system, has that demonstration; and consequently, what regard Mr. Hutchinson's claim may deserve to have paid to it. 8°, Oxford, 1753.

De Morgan has reviewed these youthful effusions of the future President and Bishop. *Budget of Paradoxes*, pp. 90–3.

1771. **Lysons, Daniel.** M.D. Com. 1744.

An Essay upon the effects of camphire and calomel in continual fevers, illustrated by several cases. 8°, London, 1771.

Practical Essays upon intermitting Fevers, Dropsies, Diseases of the Liver, the Epilepsy, &c., and the operation of calomel. 8°, Bath, 1772.

1796. **Gibbes, George Smith.** M.D. Fellow, 1793.

A few observations on the component parts of animal matters; and on their conversion into a substance resembling spermaceti. 8°, Bath, 1796.

1828. **Chambers, James Petersham.** Editor of—

Treatise of the form of animals, by H. Cline; Directions for the management of the horses' feet in the stable, &c. Norwich, 1828.

1833. **Walker, Richard.** B.D.; Demy, 1812. Schoolmaster.

The Flora of Oxfordshire and its contiguous counties. Oxf. 1833.

1840–61. **Parsons, Rt. Hon. William.**

Account of an apparatus for grinding and polishing the specula of Reflecting Telescopes. *Edinb. J. Sci.* ix, 1828.

Account of a series of experiments on the construction of large Reflecting Telescopes. *Edinb. J. Sci.* ii, 1830.

An account of experiments on the Reflecting Telescope. *Phil. Trans.* 1840.

On the construction of large Reflecting Telescopes. *Rep. Brit. Ass.* 1844.

The monster telescopes, erected by the Earl of Rosse, Parsonstown; with an account of the manufacture of the specula; and full descriptions of all the machinery connected with these instruments. 8°, Parsonstown, 1844.

Observations on some of the Nebulae. *Phil. Trans.* 1844.

Appearance of the Moon, as seen by the aid of Lord Rosse's great telescope. On cardboard 4°, London, 1846?

Notice of the Nebulae lately observed in the Six-feet Reflector. *Rep. Brit. Ass.* 1849.

Observations on the Nebulae. *Phil. Trans.* 1850.

Notes on experiments relative to Lunar Photography, and the construction of reflecting specula. *Month. Not. Astr. Soc.* xiv, 1853–4.

Further observations upon the Nebulae, with practical details relating to the construction of large telescopes. *P. R. S.* xi, 1860–2.

On the construction of Specula of six-feet aperture, and a selection from the observations of Nebulae made with them. *Phil. Trans.* 1861.

1848. **Hessey, Robt. Faulkner.** Semicom. 1844.

Tubus astronomicus: carmen Latinum. 8°, Oxon. 1848.

1848. **Allen, Thomas.** Chorister, 1809; M.R.C.S.

Plain directions for the prevention and treatment of cholera. 3rd edit. Oxon. 1848.

1839–49. **Corfe, George.** M.D.; Chor. 1818.

A popular treatise on the kidney; its hitherto unknown functions and its diseases, in connection with the circulating animal oils, &c. 8°, London, 1839.

Mesmerism; a reply to Dr. Ashburner's remarks on phrenology, mesmerism, and clairvoyance. 8°, London, 1848.

The physiognomy of disease. 4°, London, 1849.

1850–1867.

SCIENTIFIC AND OTHER WRITINGS BY MEMBERS OF MAGDALEN COLLEGE, FROM THE ERECTION OF THE DAUBENY LABORATORY, 1848, TO THE DEATH OF DR. DAUBENY IN 1867.

With additions to the Register printed as Appendix E to the History of the Daubeny Laboratory.

1858. **Ley, William Clement.**

Laws of the Wind. 1872.
Modern Meteorology. 1879.
Aids to the Study and Forecast of Weather. 1880.
Cloudland. A study in the Structure and Character of Clouds. 8°, London, 1894.

Mackenzie, William Dalziel.

On Agricultural Depression.

1860. **Barber, Edward.** F.S.A.

Papers in the *Chester Archaeological Journal.*

1861. **Michell, E. B.**

Siege Life in Paris, by one of the Besieged.

Corfield, W. H. M.D.; F.G.S.; F.C.S.; F.I.C. Memb. d'honneur and Medallist R. Soc. Pub. Health of Belgium; Hon. Corr. Memb. R. Acad. Med. Belg.; Imp. Soc. Med. Constantinople and R. Soc. Hygiene, Italy; Hon. Memb. Soc. Franç. d'Hygiène and Hungar. Soc. Pub. Health; Fell. Med. Soc. Sweden; Prof. of Hygiene and Public Health, Univ. Coll. London; Cons. Sanit. Adviser H.M. Office of Works; Pres. Epidem. Soc. London; late Med. Fellow, Pembroke

Coll. Oxf.; Medical Officer of Health, St. George's, Hanover Square. † 1903.

A Résumé of the History of Hygiene. 1870.

Reports of British Association Sewage Committee. 1870–6.

Alleged spontaneous production of the poison of Enteric Fever. *Trans. Epidem. Soc.* 1874.

Health. 1880.

Dwelling-houses; their sanitary conditions and arrangements. 2nd edit. London, 1885. 4th edit. 1898.

A Digest of Facts relating to the Treatment and Utilisation of Sewage. 3rd edit. 1887.

Sore throat caused by slight escapes of Coal Gas. *Trans. Soc. Med. Offs. Health*, 1887.

A Treatise on Hygiene and Public Health. 1892.

Laws of Health. 9th edit. 1896.

Disease and Defective House Sanitation. 1896.

The Etiology of Typhoid Fever and its Prevention. 1902.

Tetley, J. G.

Old Times and New. 1904.

Forty Years and After. 1910.

1862. **Daman, Henry.** (Known as 'Hoppy' at Eton.) † Chelsea, May 11, 1915, aged 72.

1864. **Reid, R. T.** Created 1st **Baron Loreburn.**

Vivisection Bill, April 4, 1883.

Editor of Tomlinson's The Judicature Acts. London, 1883.

Leasehold enfranchisement [with H. Broadhurst]. 1885.

Bonds of Empire. The Liberal view, p. 147. 1904.

The maintenance of the Empire. 1905.

Commerce and property in naval warfare. 1906.

Capture at sea. 1913.

1865. **Gamble, J. S.**

On the State Forests and Forest Schools of France. Awarded Gold Medal of Highl. Agr. Soc. Scotland. *Trans. H. Agr. Soc. Scotland*, Edinburgh, 1872.

List of Trees, Shrubs, and Large Climbers of the Darjeeling District, Bengal. Ed. 1, 1878. Ed. 2, 1896. Calcutta.

A Manual of Indian Timbers. Ed. 1, Calcutta, 1881. Ed. 2, London, 1902.

The Bambuseae of British India. *Ann. of the Royal Botanic Garden, Calcutta*, vol. vii. 1896.

Many papers on Forestry and Botany Subjects in the Volumes of the *Indian Forester*, which he edited for various periods between 1872 and 1899.

The Forestry Exhibition at Paris and some of its lessons. *Trans. of Royal Scottish Arboricultural Soc.*, vol. xvi. 1901.
The Forests of India and their Management. *Journal of the Royal Colonial Institute*, vol. xxxiv. London, 1903.
The Bamboos of the Philippine Islands. *Philippine Journal of Science*, vol. v—additions in vols. vi, viii. Manila, 1910, &c.
New Lauraceae from the Malayan region. *Kew Bulletin*, 1910.
Arundinarias of the hills of Sikkim. *Kew Bulletin*, 1912.
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Yet, if little stays with man,
Ah, retain we all we can!
If the clear impression dies,
Ah, the dim remembrance prize! M. ARNOLD.

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1889. **Hichens, P. S.** St. Thomas's Hosp. Hon. Physician Northampton General Hospital; Hon. Cons. Phys. Northants. Sanatorium. Major à la suite 1st East Territorial Base Hospital. Hon. mention for Essay for King's Sanatorium Prize Competition.

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Wright, A. C. Manager of Shalimar Colour and Varnish Co. Ltd.

1890. **Fennell, C. H.** Charing Cross Hosp., Paris, Vienna. Sen. Asst. Med. Off., Hellingly Asylum, Sussex.

Congenital Malformation of Heart. *Trans. Path. Soc.* 1902.
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[**Lovat, Simon Joseph Fraser.** 16th Baron.]

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1891. **Hilliard, F. P. T.** Died 190–.

Buzzard, E. F. M.D. 1902; Hon. Sec. and Fellow, Royal Society of Medicine.

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Gray, H. E. M.R.C.S.; L.R.C.P.

Walker, John Allsop. *b.* 30 Nov. 1871. Shrewsbury. M.A. 1897. Blue for Association Football, 1891–4. *m.* 1900 Margaret B. Shaw. Analytical Chemist at Burton-on-Trent.

1892. **Hill, Ernest George.** *b.* 26 Feb. 1872. II Chem. 1895; D.Sc. Dublin, 1906. Professor of Natural Science and Dean of Faculty of Science, Muir Central College, Allahabad. *m.* 1896 Margaret Brend Conder.

Report on Cloud Observations and Measurements in the Plains of the N.W. Provinces of India during the period Dec. 1898 to March 1900.
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Simpson, Herbert Clayton. *b.* 26 Nov. 1872. Lecturer in Chemistry, Montreal; Fellow of Trinity College, Toronto; Professor in English, Toronto, 1906–.

Walden, Allan Frederick. *b.* 16 Sept. 1871. Bradford Grammar School. 𝔈𝔵.; I Chem. 1895. Lecturer under Oxford C.C. 1895; Lecturer at New College, 1898–1902; Fellow 1908.

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1893. **Ashby, Harold Francis.** Harrow. III Physiol. 1896. Hants Regiment, 1898; S. Africa, 1900.

Balfour-Browne, William Alexander Francis. *b.* 27 Dec. 1874. St. Paul's. II Bot. 1896. Hockey and Cycling; Barrister. F.R.S.E., F.Z.S. Assistant to Dr. Garstang for Fishery Research, Marine Biological Association, 1901–3. Director of Sutton Broad Biological Laboratory, 1903–7. Lecturer in Entomology, Cambridge University. Member of Caius College, 1914. *m.* 1902 Elizabeth Lochead, da. of W. H. Carslaw, D.D., having issue Violet Eliz. *b.* 1 Oct. 1903, Eileen F. *b.* 20 Jan. 1905, John W. A. F. *b.* 15 May, 1907.

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Jex-Blake, Arthur John. *b.* 31 July, 1873. Eton. 𝔇.; II Cl. Mod. 1894; I Chem. 1896; Radcliffe Travelling Fellow, 1902; B.Med. 1901; F.R.C.P.; Goulstonian Lecturer, R. Coll. Phys. 1913; Asst. Phys. St. George's Hosp.; Asst. Phys. Brompton Hosp. for Consumption.

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Odling-Smee, George Smee. *b.* 25 May, 1873. Oxford Military College. III Physics, 1896. *m.* i. 1902 Emma Mary Hahn, ii. 1912 Amelia, da. of Col. Casson. Mayor of Guildford 1913–16.

Page, Alfred Finch. *b.* 2 Sept. 1873. Bradford. 𝔇.; I Chem. 1896. Formerly Master at Mill Hill School; H.M. Inspector of Schools, Board of Education, 1902–.

Shorter, Harry Vivian Spencer. 𝔇.; II Chem. 1896; Asst. Master, Wheelwright Grammar School, Dewsbury; Sheffield Grammar School, 1903; King Edward VII School, Sheffield, 1905.

Stancomb, William. Son of William Stancomb (*Daubeny Register*, vol. 1, p. 114). II. Chem. 1896. Brewer at Guinness's Brewery, Dublin. † Jan. 1907.

Sherwood, Edward Charles. *b.* 5 Feb. 1873. Magdalen College School. ; II Math. Mods. 1894; II Math. 1896; II Chem. 1897. 'Varsity VIII, 1895; Science Master, Westminster School, 1901. F.C.S. Orders. Head Master, St. Lawrence College, Ramsgate, 1906.

Scott, Samuel Geoffrey. *b.* 11 March, 1875. Clifton. III Physiol. 1897; St. Thomas's Hosp.; B.Med. 1902. Demonstrator in Histology, Oxford; F.R.S.Med.

Endotheliomata. [With E. M. Corner.] *Trans. Path. Soc. Lond.* 1903.

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Jones, George Arthur. III Physiol. 1897; L.S.A. 1902. St. George's. Anaesthetist Samarit. Free Hosp., Grosvenor Hosp. *m.* 1903 Marjory Wright.

Chapman, Edward Henry. *b.* 5 Feb. 1874. Eton, II Morph. 1897. Barrister-at-Law. *m.* 1910 Elsie, da. of F. Adair Roberts. Captain T.F. Reserve, 1915.

1894–1915.

REGISTER OF NAMES OF MEMBERS OF MAGDALEN COLLEGE WHO HAVE ATTENDED COURSES OF SCIENTIFIC INSTRUCTION SINCE 1894.

Extra tuition in honour chemistry has been given by

J. Watts, D.Sc. Lond.	1885–1899
D. R. Wilson, Magd.	1899–1903
N. V. Sidgwick, Linc.	1903–1907
T. S. Moore, Magd.	1907–1914

and in honour physiology by Dr. Ramsden of Pembroke and Dr. Vernon of Magdalen.

𝔇. = Demy; 𝔖. = Scholar; 𝔈𝔵. = Exhibitioner.

1894.

Armitage, Francis Paul. *b.* 21 April, 1875. R. Grammar School, Lancaster. 𝔈𝔵.; I Chem. 1898; F.C.S. Asst. Master at St. Paul's School.

A History of Chemistry. 266 pp. London, 1906.

Blaine, Gilbert. Matric. 1894. 2nd Lt. 3rd Batt. Somersets.

Hunt, Richard. *b.* 22 Aug. 1874. Charterhouse, matric. 1893. Farming near Colchester. *m.* 1897 Elizabeth C. Dove.

Ormrod, John Baxter. *b.* 19 May, 1875. Manchester Grammar School. 𝔇.; I Math. 1898; I.C.S. 1898. Collector and Assistant Commissioner of North-West Provinces and Oudh. 1899. *m.* 1905 Dora McCombish.

Tinne, Philip Frederic. *b.* 20 Dec. 1874. Eton. III Physiol. 1897; M.R.C.S., L.R.C.P. 1902; M.B. 1904. H.S. and H.P. St. George's Hospital.

1895.

Crossley, Sir Kenneth Irwin. 2nd Bart. *b.* 17 Feb. 1877. Eton. III Chem. 1898. Member of Engineering Firm of Crossley Bros., Manchester. Of Mobberley Hall, near Knutsford, Cheshire. *m.* 1901 Florence J. Field.

Grazebrook, George Ward William. *b.* 31 March, 1877. Eton. IV Chem. 1898. With Wolseley Motors Limited

(Vickers, Ltd.), Birmingham, 1914. *m.* 1902 Eleanor B. Charrington.

Hildesheim, Oscar. *b.* 20 Aug. 1876. 𝔈𝔵.; I Physiol. 1899; B.Med. 1902; M.D. 1905. Div. Police-Surgeon; late House Physician St. Thomas's.

Fat Metabolism of Liver. *J. Physiol.* 1904.
Epidemic Cerebro-Spinal Meningitis and posterior basic Meningitis. *Lancet*, 1905.
Hydrocephalus and posterior basic Meningitis. *Pract.* 1905.
The Health of the Child. 8°, 1915.

Sartoris, Arthur Hugh. *b.* 4 Oct. 1875. Eton. Matric. 1895. Of Weekley and Rushden Hall; J.P. for Northants.

Spilsbury, Bernard Henry. *b.* 16 May, 1877. II Physiol. 1899; M.B. 1905. Medical expert in Crippen and other criminal cases. Lecturer in Pathology and Curator Pathological Museum, St. Mary's Hosp.

Primary Adrenal Carcinoma in the Liver. *Trans. Clin. Soc.* 1905.
Pneumonia caused by B. typhosus in the course of Enteric Fever. *Trans. Clin. Soc.* 1905.
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Wilson, Duncan Randolph. *b.* 27 Dec. 1875. Eton. 𝔇.; I Chem. 1898. Lecturer in Chemistry at Magdalen, 1899–1903; H.M. Inspector of Factories, 1904–. *m.* 1915 Freda, da. of James Lee.

1896.

Cardwell, Hugh Brodie. *b.* 1877. Clifton, matric. 1895. *m.* Violet Lindsay-Hogg. Maj. 6th Sussex Batt. R.F.A.

Golla, Frederic Lucien. *b.* 11 Aug. 1877. 𝔇.; I Physiol. 1900; M.B. 1904; M.R.C.P. 1907. Asst. Physician St. George's; Lecturer on Pharmacology and Clin. Medicine, St. George's. Lt. R.A.M.C.

Therapeutic use of Pituitary Extract. *Lancet*, 1902.
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Turnbull, Hubert Maitland. *b.* 3 March, 1875. Charterhouse. II Physiol. Association Football XI, 1897. Welsh Memorial Prize, 1899; B.Med. 1902; Radcliffe Travelling Fellow, 1904; M.D. 1906. London Hosp., Copenhagen, and Dresden. Director Pathological Institute, London Hosp. *m.* 1916 to Catherine Nairne, y. da. of F. Arnold Baker.

Bilateral Loss of Post Central Cortex, apparently Congenital in Adult. *Brain*, 1904.

Editor and Contributor to *Arch. Path. Inst.*, London Hospital, 1908.

1897.

Kaye, Henry Wynyard. *b.* 21 May, 1875. Winchester. II Cl. Mods. 1896; M.B. 1903; M.R.C.S., L.R.C.P. 1903; M.D. 1908. Physician to Nicolson Mackenzie Memorial Hosp., Strathpeffer Spa (May to Nov.); Medical Officer, Villa Emily Home for Invalid Ladies, San Remo (Nov. to May). *m.* 1906 Amy Wigram.

Health Resorts: their Position and Use.

Medical Guide, Strathpeffer Spa.

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Maclachlan, Alexander Fraser Campbell. *b.* 23 July, 1875. Eton, matric. 1894. Lieut. King's Royal Rifles, 1901, D.S.O.; Capt. 1906; Adjt. 1907–10. Served in S. Africa (wounded and mentioned in dispatches).

Singer, Charles Joseph. *b.* 2 Nov. 1878. City of London, and University College, London. 𝔈𝔵.; II Zool. 1899; M.B. 1905; M.R.C.P. 1909; M.D. 1911; F.R.S.Med. Surgeon to Sir J. Harrington's Expedition to the Sobat River, 1903–4; Physician, Dreadnought Seamen's Hospital;

Registrar of Research Institute, Cancer Hospital, S.W. 1911; Mitglied der deutschen Gesellsch. für Geschichte der Medizin u. d. Naturwiss. *m.* 1910 Dorothea, da. of Nathaniel Cohen. Philip Walker Student in Pathology; Pathologist to Central Military Hosp., Chatham, 1914.

Falashas of Abyssinia. *Jewish Quart. Review*, 1905.

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Fleischmann, Friedrich Noel Ashcroft. *b.* 14 Aug. 1879. Rugby. Stud. at Tübingen, 1901. I Chem. 1901. *m.* 1904 Constance, da. of J. C. im Thurm. Collector of Zeolites, of which he presented 900 to the British Museum.

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Hertz, Arthur Frederick. *b.* 23 July, 1879. Manchester Grammar School. 𝔇.; I Physiol. 1901. 𝔖. Guy's Hosp. 1901; M.B. 1904; M.D. 1907; F.R.C.P. 1910. Guy's, Munich, Strassburg, Paris; Radcliffe Travelling Fellow, 1905. *m.* 1912 Cushla Riddiford. Radcliffe Prize for Medical Research, 1909; Goulstonian Lecturer R.C.P. 1911; Asst. Phys. and Phys. for Nervous Diseases and to Electrical Dept., Guy's Hosp.; F.R.S. Med.; late Demonstrator Physiol. Pharmacology and Morbid Anat., Guy's Hosp.

Pathology and Treatment of Oedema, with special reference to Influence of Sodium Chloride on its Formation. *Guy's Hosp. Reps.* 1906.
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Johnson, George Montague. *b.* 16 Feb. 1879. Charterhouse, IV Physiol. 1901; M.B. 1908.

Ryder, Charles Frederick. *b.* 24 Feb. 1879. Charterhouse. 𝔇.; II Zool. 1901. Association Football XI, 1899–1901; Lawn Tennis, 1900–1. In Legal Secretary's Office, Khartoum, Sudan Civil Service. 2nd Lieut. Yorkshire Hussars.

Strutt, George Aston. *b.* 24 Nov. 1878. Harrow. Matric. 1897. Captain 'Varsity Shooting VIII, 1899–1901. *m.* 1904 Hon. Winifred Cavendish. J.P.; Derbyshire County Council; Major, Derbyshire Yeomanry.

Vickers, Vincent Cartwright. *b.* 16 Jan. 1879. Eton. Matric. 1897. *m.* i. 1905 Mairi Clark, ii. 1910 Nannette Leslie. Director of Messrs. Vickers, Sons, and Maxim, Ltd., and of London Assurance Corporation.

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Whitnall, Samuel Ernest. *b.* 30 March, 1876. Radley. III Zool. 1901; Welsh Memorial Prize, 1903; M.B. 1908; M.R.C.S., L.R.C.P. 1908; Radcliffe Prize, 1913. *m.* 1908 Zoe Wyllie. University Demonstrator in Anatomy, Oxford; Hon. Sec. Section of Anatomy, Brit. Med. Assoc. 1912. Lieut. R.A.M.C., Base Hosp., Oxford, 1915.

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1898.

Hilton, Harold. Fellow, 1898–1906. Prof. of Mathematics, University of London.

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Curling, Bryan James. *b.* 21 Sept. 1877. Eton. B.A. 1899. *m.* 1907 Lilian M. Wells. Lieut. King's Royal Rifles, 1901; Capt. 1908; Staff-Capt. War Office, 1914.

Medlicott, Walter Sandfield. *b.* 28 Aug. 1879. Harrow. Matric. 1898. *m.* 1910 Lavender, daughter of Alfred Pease, Bart. Lieut., Northumberland Hussars.

Neave, Sheffield Airey. *b.* 20 April, 1879. Eton. III Zool. 1902. O.U. Athletic Team, 1899 and 1901. Naturalist on Geodetic Survey of Rhodesia, 1903. *m.* 1915 Dorothy, da. Lieut.-Col. Middleton.

On a large collection of Rhopalocera from the shores of the Victoria Nyanza. *Novitates Zoologicae*, xi, 1904.

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R. C. Wroughton: On a collection of mammals made by Mr. S. A. Neave in Rhodesia, north of the Zambesi, with field-notes by the collector (5 new species).
Memoirs and Proc. of the Manchester Literary and Philosophical Society, vol. li, pt. ii. 1906-7.

G. Dolman, B.A.: On mammals collected in Katanga, Congo Free State, by Mr. S. A. Neave (1 new species).
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INSECTS.

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Edward Meyrick, B.A., F.R.S. *Exotic Lepidoptera* (10 new genera and 70 new species). July and December, 1914.

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The Neave Collection of Longicorns includes types of several new genera and many species new to science, one of which Aurivillius calls *Pseudonupserha Neavei.*
(5 new genera and about 80 new species.)

Other papers by S. J. Arrow in *Ann. & Mag.*

Hymenoptera.

Numerous papers describing over 50 new species, by G. Meade-Waldo and R. E. Turner in *P. Z. S.*, *Trans. Ent. Soc.*, and *Ann. & Mag.*

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Spencer, William Kingdon. *b.* 10 Dec. 1878. Batley Grammar School. 𝔇.; I Zool. 1902; Burdett-Coutts

Scholar, 1902; Hon. mention, Rolleston Memorial Prize. Demonstrator in Geology, 1903. F.G.S. Jun. Inspector of Schools, 1903. *m.* 1904 Kate V. Stewart.

A Monograph on the British Fossil Echinodermata from the Cretaceous Formations. Vol. 2. The Asteroidea.
Monogr. Palaeontographical Society, Part 3, 1905; Part 4, 1907; Part 5, 1908.

The Evolution of the Cretaceous Asteroidea.
Philosophical Transactions, cciv, pp. 99–177, 7 pls., Aug. 1913.

A Monograph of the British Palaeozoic Asterozoa.
Monogr. Palaeontographical Society, Pt. i, pp. 1–56, 1 pl., Feb. 1914.

Webb, Arthur James. *b.* 2 Nov. 1879. Dulwich. Ex.; II Chem. 1901. B. Sc. Lond. 1901. *m.* 1908 Edith M. Peet. Research Chemist with Messrs. Johnson, Matthey & Co.

Dutton, Henry Hampden. *b.* 13 Feb. 1879. St. Peters, Adelaide, and Lancing. III Geol. 1902. O.U. VIII, 1900. *m.* 1905 Emily Martin. Landholder and Stockbreeder, Anlaby, Kapunda, S. Australia.

Across Australia by Motor. 1908.

1899.

de la Rue, Ivor Andros. *b.* 2 Dec. 1880. Eton. III Chem. 1902. Rackets, 1901–2.

Galloway, John. *b.* 8 March, 1881. Charterhouse. III Physiol. 1903. Of the Inner Temple, 1903.

Girdlestone, Morrell Andrew. *b.* 29 April, 1879. Weymouth. Lieut. Royal Garrison Artillery, 1902; Native Artillery, India, 1903; Capt. 41st Dogras, Indian Army, 1909. *Shot* by a sniper when on the look-out in the trenches, April 1915.

Monck, George Stanley Stevens. Son of W. B. Monck (*Daub. Reg.* p. 106). *b.* 1880. Eton; matric. 1899.

Riley, Percy Herbert. *b.* 12 April, 1880. Eton. IV Chem. 1903. *m.* 1904 Eliza Gertrude Littleton. Music printer.

Semon, Henry Charles Gustav. *b.* 9 March, 1881. Clifton, II Physiol. 1903; S. Univ. Coll. Hosp.; M.R.C.S., L.R.C.P. 1905; M.D. 1911.

Simonds, John Hayes. *b.* 16 April, 1879. Wellington. B.A. 1900. Major, Royal Berkshire Regiment, 1915. Banker (J. and C. Simonds and Co., Reading Bank).

Stewart, David Macfarlane. *b.* 31 Oct. 1878. Hutcheson's Grammar School, Glasgow; Glasgow Univ. 𝔇.; I Math. Mods.; II Cl. Mods.; I Physics; II Lit. Hum.; I Math.; II Law. I.C.S. 1902, Bengal; Under Sec. to Government, April, 1907–8; Joint Magistrate and Dep. Collector U.P. 1912.

Sturrock, William Duncan, *b.* 16 May, 1880. Charterhouse. 𝔈𝔵.; I Physiol. 1903; 𝔖. King's Coll. Hosp.; M.B. 1906; M.R.C.S., L.R.C.P. 1905; M.D. 1912; Surg.-Capt. O.T.C.

First Principles of Hygiene, 1913.

Reaction of Blood Serum as an Aid to Diagnosis of Cancer. *B. M. J.* 1913.

Gastric Haemorrhage and other Complications in Case of Childbirth. *B. M. J.* 1913.

Walker, Bertram James. Matric. 1899. 2nd Lieut. Northamptonshire Imperial Yeomanry, South Africa. Capt. 8th R. Sussex Regt. 1915.

1900.

Clowes, George Charles Knight. *b.* 5 July, 1882. Winchester; matric. 1900. Member of Firm of W. Clowes and Sons, Ltd., Printers. Capt. London Scottish, 14th Batt. County of London.

Knight, John Guy Douglas. *b.* 18 Oct. 1881. Charterhouse; matric. 1900. Served in South Africa. *m.* 1900 Ruby Feilde. Farming in Manitoba, Canada.

Wallin, Charles Ethelbert. *b.* 26 Oct. 1881. Brackley School. 𝔈𝔵.; III Math. Mods.; II Chem. 1903. Analytical Chemist in the Steel Works of Messrs. Cammel, Laird, Sheffield. In Steel Works in New Brunswick, 1914. Gasworks Products, Sydney, Nova Scotia, 1915.

Newbold, William. II. Lit. Hum. 1901. Made some use of the Cooke Equatorial Telescope and reported on its capabilities. F.R.A.S. Asst. Master, Tonbridge School. Lieut. 119th Heavy Battery R.G.A.

1901.

Douglas, Claude Gordon. *b.* 26 Feb. 1882. Wellington. 𝔇.; matric. New College, 1900; I Physiol. 1904; B.Sc. 1906; M.D. 1913; 𝔖. Guy's Hosp.; Radcliffe Prize, 1911. Fellow and Lecturer St. John's College, 1907–. Lieut. R.A.M.C. Military Cross, 1916.

Method for Determination of Blood Volume in Animals. *Physiol. J.* 1906.

Cheyne-Stokes Breathing. [With J. S. Haldane.] *Physiol. J.* 1909.

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Effects of previous forced breathing and oxygen inhalation on the distress caused by muscular work. [With J. S. Haldane.] *P. Phys. Soc.* June 1909.

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The oxygen capacity of the blood after haemorrhage. *J. Physiol.* March 1910.

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The Causes of the Absorption of Oxygen by the Lungs. [With J. S. Haldane.] *Physiol. J.* 1912.

The Physiological Effects of Low Atmospheric Pressures, as observed on Pike's Peak, Colorado. [With Haldane, Henderson, and Schneider.] *P. R. S.* April 1912.

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The sensitiveness of the respiratory centre to CO^2, and the dead space during hyperpnoea. [With J. M. Campbell and F. G. Hobson.] *J. Physiol.* July 1914.

Everitt, Charles. *b.* 23 Jan. 1882. E. London College. 𝔇.; I Math. Mods.; I Chem. 1902; IV Geol. 1903. On staff of 'Encyclopaedia Britannica'.

Martin, Charles Herbert George. *b.* 5 Oct. 1881. Eton. II Zool. 1904; Rolleston Memorial Prize, 1910. Asst. to Sir J. Murray's Survey of Freshwater Lochs of Scotland, 1905; Asst. Lecturer Glasgow University, 1909. *m.* 1912 Beatrice, daughter of Ferd. Hanbury; Master of Crickhowell Harriers, 1912. Lieut. 3rd Monmouths. *Killed in action*, 4 May, 1915.

Notes on some Oligochaets found on the Scottish Loch Survey.
Notes on some Turbellaria from Scottish Lochs. *Proc. Royal Soc. Edinburgh*, xxviii, 1907.
The Nematocysts of Turbellaria. *Q. J. Micr. Sci.* lii, 1908.
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Some observations on Acinetaria. *Q. J. M. S.* Jan. and May 1909.
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Contributions to the study of Pathogenic Amoebae from Bombay. [With W. G. Liston.] *Q. J. M. S.* Nov. 1911.
A note on the early stages of the large Amoeba from Liver Abscesses. *Q. J. M. S.* Nov. 1911.
Further observations on the Caecal Parasites of Fowls. [With M. Robertson.] *Q. J. M. S.* lvii, 1911.
A note on the Protozoa from Sick Soils, with some account of the Life-Cycle of a Flagellate Monad. *Proceedings Royal Society*, 1912.
The Presence of Protozoa in Soils. *Nature*, April 3, 1913.
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A note on the Occurrence of Nematocysts and similar structures in the various Groups of the Animal Kingdom.
Biologisches Centralblatt, xxxiv, pp. 248–273, 8 text figs., April 1914.

Some notes on Soil Protozoa. [With K. R. Lewin.]
Philosophical Transactions, 1914.

Obituary Notice in *Oxford Magazine*, 14 May, 1915.

Daniel, William Rothwell. 𝔇.; II Math. Mod.; I Chem. 1903. In S. Africa, 1903.

de la Rue, Stuart Andros. *b.* 29 May, '83. Eton. Matric. 1901; went down 1903. *m.* 1912 Margaret, daughter of Alex. Wedderburn, K.C.

Fisher, Kenneth. *b.* 18 July, 1882. Manchester Grammar School. 𝔇.; II Chem. 1904; 𝔖𝔢𝔫. 𝔇. 1905; Ph.D. Jena, 1906. Asst. Master, Clifton College. *m.* 1911 Constance, daughter of James Boyd. Lieut. O.T.C., Clifton College.

Die Umwandlungen der desmotropen Diacetbernsteinsäureester in Lösungen, ein Beitrag zur Tautomerielehre.
Inaugural Dissertation for Jena Ph.D. Printed A. Kämpfe, Jena. 1906.

Experiments on the Synthesis of the Terpenes. [With Prof. Perkin.] Part I (cont.) Resolution of dl-7-methyl-Δ^1-cyclohexene-4-carboxylic acid and synthesis of the optically active modifications of terpineol. *J. C. S.* 1908.

Part XIII. Synthesis of Iso-carvestrene ($\Delta^{6:3(9)}$)-m-menthadiene) and its derivatives. *J. C. S.* 1908.

Potter, Ley Francis. *b.* 27 Feb. 1882. Wyggeston and Worcester Royal Grammar Schools. 𝔇.; I Chem. 1904; Heidelberg, 1905–6, Ph.D. King's School, Coventry, 1904. Senior Science Master, Hulme Grammar School, Oldham, 1906.

Meade-Waldo, Geoffrey. *b.* 8 Jan. 1884. Eton. M.A. 1911. Assistant in Entomological Dept., British Museum. † 11 March, 1916.

On new species of Diploptera in the British Museum.
Annals and Mag. Nat. Hist. pp. 30–51, 1910;
100–10, 1911; 98–113, 1911.

Notes on the Family Masaridae (Hymenoptera) with descriptions of a new genus [Metaparagia] and three new species.
Ann. pp. 747–50, 1911.

Description of new species of African Diploptera in the collection of the British Museum. *Ann.* pp. 445–57, 1911.

Enumeration of Hymenoptera (Fam. Vespidae, Apidae, Tenthredinidae) collected in Dutch New Guinea by the expedition of the British Ornithologists Union. *Ann.* pp. 446–55, 1912.

Notes on the Apidae in the collection of the British Museum. *Ann.* pp. 461–78, 1912.

New species of Diploptera in the collection of the British Museum. *Ann.* pp. 44–54, 1913.

Four new species of Apidae, with notes on other species. *Ann.* pp. 491–7, 1913.

Notes on Apidae in the collection of the British Museum. *Ann.* p. 92, 1913.

Forty-eight hours in Sarawak. *Sarawak Museum Journ.* vol. i, no. 3, 1913.

On Apidae in the British Museum. *Ann.* pp. 45–58, 399–405, 1914.

Notes and Synonyms of Hymenoptera in the collection of the British Museum. [With Claude Morley.] *Ann.* pp. 402–10, 1914.

Notes on the Hymenoptera in the collection of the British Museum, with Descriptions of New Species. *Ann.* xiv, pp. 450–64, 1914.

A revision of the species of Odynerus (Hymenoptera) occurring in the Ethiopian Region. *Trans. Ent. Soc. Lond.* pp. 485–520. Plate. 1914.

Notes on Apidae in the collection of the British Museum. *Ann.* xv, pp. 325–35, 1915.

Flower, Conrad Herbert. *b.* 29 April, 1882. Winchester. Entered Motor-car business, 1903. Capt. 16th Batt. Q. O. Westminsters.

1902.

Stewart, Robert Henry Rynn. *b.* 18 Sept. 1883. Wellington. II Chem. 1905. Barrister-at-Law, co. Dublin. R.N.R. 1915. *m.* 1915 Edith, da. of Lt.-Col. E. C. Martin.

Ackers, Charles Penrhyn. *b.* 28 June, 1882. Eton. II Chem. 1905; B.Sc. Durham. Of Huntley Manor, Glos. Farming. Lieut. A.S.C.

Aldridge, Frederick James. *b.* 2 July, 1893. Worcester Grammar School. III Physiol. 1906; M.R.C.S., L.R.C.P. 1909; M.B. 1910 St. Thomas's. Medical Practitioner in Glastonbury.

Bethell, Hon. Richard. *b.* 26 April, 1883. Eton. *m.* 1911 Evelyn, daughter of late Colonel Hutton, C.B. 2nd Lieut. Scots Guards, 1914.

Carlisle, Kenneth Methven. *b.* 7 Aug. 1882. Harrow. B.A. 1905. Capt. O.U.C.C. 1905. *m.* 1907 Minnie Donner. Merchant.

Gardner, Thomas Edward. *b.* 3 June, 1883. Bradford. 𝔇.; II Chem. 1905.

The action of tribromo-propane on the sodium derivative of ethyl aceto acetate. [With Prof. Perkin.] *J. C. S.* 1907.

Osborne, Charles Glidden. *b.* 9 Feb. 1884. Charterhouse. Now in U.S.A.

Stancomb, John. *b.* 1 Dec. 1883. Son of William Stancomb (see *Daub. Reg.*, p. 114).

Dinham, Charles Hawker. *b.* 7 July, 1883. Haileybury. Classical 𝔈𝔵.; III Chem. 1906; I Geol. 1907; Hon. mention for Burdett-Coutts Schol. 1907. Completed the naming and arrangement of the Stratigraphical Geological Collections in the Oxford Museum. Asst. to Geological Survey and Museum, Edinburgh.

1903.

Morrell, James Herbert. *b.* 9 July, 1882. Eton. III Cl. Mod. 1903; III Phys. 1905. O.U.A.C. 100 yds. 1904–5; $\frac{1}{4}$ mile 1902, 4, 5; $\frac{1}{2}$ mile 1903. Barrister-at-Law. *m.* 1913 Julia, daughter of Sir G. Denton, K.C.M.G. Lieut. O.U.O.T.C.

Stobart, James Douglas. *b.* 25 April, 1884. Radley. B.A. 1905. Spare man, Varsity VIII, 1904. In business. Lieut. 2nd London Divisional Train A.S.C.

Fry, Herbert John Burgess. *b.* 19 June, 1885. Charterhouse. 𝔈𝔵.; I Physiol. 1907; B.Sc. 1909; M.B. 1911; M.R.C.S., L.R.C.P. 1911. Biological Scholar at Naples, 1908; Asst. Director Pathological Department, St. Thomas's Hosp.

Influence of the Visceral Nerves upon the Heart in Cephalopods. *J. Physiol.* 1909.

Blood Platelets and the Coagulation of Blood in Marine Chordata. *Folia Haematologica*, 1910.

Decalcifying action of Oxalic Acid Poisoning. *Lancet*, 1913.

Nalder, Howard Gilbert. *b.* 21 March, 1884. Charterhouse; read Botany. Interested in Motoring.

Beevor, Charles Ferrier. *b.* 10 Sept. 1884. Charterhouse. III Chem. 1906; M.B. 1912. Univ. Coll. Hosp.; late House Surgeon, Charing Cross Hosp. *m.* 1910 Janne Macbeth.

Birchall, Edward Vivian Dearman. *b.* 10 Aug. 1884. Eton. IV Chem. 1907. Hon. Sec. National Association of Guilds of Help and of Agenda Club; Capt. Bucks. Batt. Oxf. & Bucks L.I.

Dutton, Francis Bridger. *b.* 21 Sept. 1885. Eton. III Chem. 1907. *m.* 1913 Sydney Eleanor, daughter of Capt. Cecil Montagu. Barrister-at-Law, 1910; Medical Student, 1915.

Hubbard, Hon. **Raymond Egerton.** *b.* 1884. Eton. III Chem. 1907. Member of firm of John Hubbard & Co., St. Petersburg.

Willett, Herbert William Mills. *b.* 28 July, 1884. Rugby. III Chem. 1906. Member of firm of William Willett, Builder, London.

Pratt-Barlow, Robert Francis. *b.* 26 Aug. 1885. Charterhouse. Worked at Physics for a short period. Member of firm of John Dickinson & Co., paper-makers.

1904.

Stokes, Edward. *b.* 1880. St. Peter's, Adelaide. III Chem. 1906. *m.* 1909 Mary Ram. House Master, Queen's School, Adelaide, 1902–3; Science Master, King William's College, Isle of Man, 1907–8; Head Master, Government High School, Bareilly, U.P., India, 1908–.

Tizard, Henry Thomas. *b.* 23 Aug. 1885. Westminster. 𝔇.; I Math. Mods.; I Chem. 1908. Worked in Prof. Nernst's Lab., Berlin, Oct. 1908–July 1909; Magd. Coll. Lab. Sept. 1909; Master at Eton, Nov. 1909. Fellow and Lecturer in Nat. Science, Oriel, 1911–. 2nd Lieut. R.G.A. 1914. *m.* 24 April, 1915, Kathleen Eleanor Wilson.

The Colour Changes of Methyl-Orange and Methyl-Red in Acid Solution. *Trans. Chem. Soc.*, 1910.

The Hydrolysis of Aniline Salts measured colorimetrically.

The Mechanism of Tautomeric Change. *Proc. Chem. Soc.*, 1910.

Nernst's *Theoretical Chemistry.* [Translation.] 8°, 1911.

On the Velocities of Ions in Dried Gases. [With R. T. Lattey.] *P. R. S.*, p. 349, 1912.

Effect of a Magnetic Force on the Motion of Negative Ions in a Gas. [With J. S. Townsend.] *P. R. S.*, p. 357, 1912.

Glover, Harold Matthew. *b.* 29 Oct. 1885. Royal Grammar School, Worcester. 𝔇.; I Math. Mods.; I Geol. 1907; Diploma of Forestry, 1908. Indian Forest Service.

Walling, Ernest. *b.* 11 Dec. 1885. Giggleswick. 𝔈𝔵.; II Chem. 1907. Math. Master, Dulwich Prep. School, 1909; Research with H. Baker at Ch. Ch., Lent, 1910; Oxford High School, 1910–12; Sen. Science Master, Leeds Grammar School, 1912–. Lieut. 7th Batt. W. Yorks. Regt.

Downs, George Edward. *b.* 18 Sept. 1885. Royal Grammar School, Worcester, II Physiol. 1908; M.B. 1911. Late Sen. House Phys., St. Thomas's. *m.* Aileen Lingard Escombe, 1916.

Clarence, George Clarence. *b.* 2 Mar. 1885. Radley. III Botany, 1909.

Carr-Saunders, Alexander Morris. *b.* 14 Jan. 1886. Eton. I Zool. 1908. Naples Biol. Student, 1908–9; Demonstrator at Oxford, Mich. 1909–Lent 1910; Research with Karl Pearson at Univ. Coll. London, Summer 1910. Lieut. A.S.C.

The Development of Aplysia punctuata. [With Margaret Poole.] *Q. J. M. S.* Sept. 1910.

Pigmentation in relation to Selection and to Anthropometric Characters. *Biometrika*, viii, Jan. 1912.

A Criticism of Eugenics. *Eugenics Review*, Oct. 1913.

Garton, Charles Leslie, *b.* 19 May, 1885. Eton. B.A. 1907. Member of firm of Garton & Co., Glucose manufacturers.

1905.

Laws, Ernyst Graham. *b.* 26 June, 1886. Oxford City Technical School and Non-Coll. Student; 𝔇. 1905; I Chem. 1908; F.C.S. Research at Magd. Coll. on Uranium Glass, 1908; B.Sc.; Master at Oxford City Tech. School, 1903–9; Science Master, County Secondary School, Ramsgate, 1909–.

Isomeric Acetaldehydephenyl hydrazones. *T. C. S.* xcix.

Priest, Carl Rhodes. *b.* 22 May, 1886. Christ's Hospital. 𝔈𝔵. 1905; Math. Asst. Master, St. Neot's, Eversley, Hants. *Died* of wounds, France, 22 Jan. 1916.

Lloyd, Stephen Pemberton Lucius. *b.* 24 Aug. 1886. South-Eastern Coll., Ramsgate. Won the mile against Cambridge, 1907, in 4 min. 28 sec., and again in 1908.

Odling, Marmaduke. *b.* 3 July, 1886. Radley, 1905. II. Geol. 1908; B.Sc. 1912. F.G.S. Assistant to Professor of Geology, Leeds University, 1914–.

The Radley District: Geology, pp. 98–123.
8°, Parker, Oxford, 1912.

The Bathonian Rocks of the Oxford District. *Q.J.G.S.* lxix, 1913.

Fossil Fauna of the Oxford District. Part. i.
Rep. Ashmolean Soc. 1915.

The Relations between the various facies of the Upper and Middle Oolites in different districts of England and N.W. France. *Proc. Yorks. Geol. Soc.* 1916.

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Report on Geological Sections exposed during the widening of the G.N.R. between Essendine and Corby.

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Sparrow, Walter Geoffrey Kay. *b.* 1887. Charterhouse. Lieut. Cheshire Yeomanry.

Robertson, Manning Durdin. *b.* 29 May, 1887. Eton. Architect. *m.* 1912 Nora, daughter of Lt.-General Sir Laurence Parsons, K.C.B.

Robinson, Roy Lister. St. Peter's, Adelaide. Rhodes Scholar, I Geol. 1907; Burdett-Coutts Scholar, 1907. Won the weight competition against Cambridge, 1907 (37 ft. 7 in.). Sec. to Advisory Committee on Forest Development and Superintendent of Forest Inspection. At Dept. of Explosives Supplies, Ministry of Munitions, 1915.

Moulton, John Coney. *b.* 11 Dec. 1886. Eton. B.Sc. 1912; F.L.S., F.Z.S., F.E.S., M.B.O.U. Curator of Rajah Brooke's Museum, Sarawak. Lieut. 4th Batt. Wilts Regt.

On the Lepidoptera Rhopalocera collected by W. J. Burchell in Brazil, 1825–30. VI. Nymphalinae.
Ann. & Mag. Nat. Hist. ii, p. 195; iii, pp. 7–20, 98–111. 1908–9.

On some of the principal mimetic (Müllerian) combinations of tropical American butterflies. *Trans. Ent. Soc.* 1909.

A list of the Bornean Cicindelidae. *Notes Leiden Mus.* xxxii, 1910.

A contribution to the study of the insect fauna of Borneo. A List of the Bornean *Buprestidae.* *J. Sarawak Mus.* i, 1911.

Two new *Cicada* from Sarawak, with a note on the Bornean species of the genus *Cosmopsaltria.* *J. Sarawak Mus.* i, 1911.

Material for a Fauna borneensis: a list of Bornean Cicadidae. *J. Straits Asiatic Soc.* lvii, 1911.

A list of the butterflies of Borneo with descriptions of new species. Part iii, Lycaenidae. *J. Straits Asiatic Soc.*1911.

On some unintentional evidence in support of the mimicry theories, supplied by a small collection of Bornean butterflies. *Ent. Mo. Mag.* xlviii, 1912.

Butterflies taken on the Batu Lawi expedition. *J. Straits Asiatic Soc.* lxiii, 1912.

Some additional notes on *Buprestidae* found in Sarawak, together with a brief comment on the geographical distribution of all the species of Buprestidae now known from the Island of Borneo. *J. Sarawak Mus.* i, 1912.

Museum Notes on the fungus parasites of insects. *J. Sarawak Mus.* i, 1912.

'Where Wallace trod': being some account of an entomological trip to Mt. Serambu, Sarawak, Borneo. *Entomologist,* Aug.–Sept. 1912.

An expedition to Mt. Batu Lawi; with appendices on some of the collections made by H. N. Ridley, C.M.G., F.R.S; E. B. Copeland, J. J. Smith, Dr. A. Griffini, F. F. Laidlaw, M.D., F.Z.S., and J. C. Moulton, with a map, plate, and 4 text-figures. *J. Straits Asiatic Soc.* lxiii, 1912.

On some new and little-known Bornean *Lycaenidae*; together with a revision of the Thecline genus *Thamala,* Moore. *Trans. Ent. Soc.* Lond. 1913.

A brief visit to Malacca. *Entomologist,* Oct. 1913.

Some notes on a short collecting trip to Mt. Poi, Sarawak. *J. Straits Asiatic Soc.* lxiii, 1913.

A collecting expedition to Mt. Kinabalu. *The Sarawak Gazette,* Nov. 1913.

The first reliable account of the Orang-utan (*Simia satyrus,* L.). *Zoologist,* Sept. 1913.

Zoological notes on a collecting expedition in Borneo. *Zoologist,* Oct. 1914.

A list of the Butterflies of Borneo. Part iv—Papilionidae. *J. Straits Asiatic Soc.* lxvii, 1914.

Hand-list of the Birds of Borneo. *J. Straits Branch R. Asiatic Soc.* pp. 125–91, 1914.

Annual Reports on the Sarawak Museum. 1908–14.

Some undescribed Bornean Nymphalidae. *Entomologist,* May 1915.

Cox, Cuthbert Eustace Connop. *b.* 9 Mar. 1885. Bradfield. Forestry Student. Asst. Conservator Forest Department, Central Prov., India.

Osmaston, Arthur Edward. *b.* 4 Mar. 1885. Bedford. Forestry Student. Asst. Conservator Forest Department, United Prov., India.

Fenwick, Christian Bedford. Eton. M.A. 1912. Barrister-at-law. Capt. N. Cyclist Batt., T.F. *m.* 1915 Mary B. Wait.

Rice, Guy Vere. *b.* 8 Nov. 1888. Merchant Taylors and Forest School, Walthamstow. Math. 𝔇.; III Physics, 1909.

1906.

Hammick, Dalziel Llewellyn. *b.* 8 Mar. 1887. Whitgift School. 𝔇.; I Chem. 1909. Studied at Munich. Master, Gresham's School, Holt, 1910. *m.* 1911 Philippa, daughter of Assheton Tilbrook.

Atoms. *Translation of Perrier's Les Atoms.* In the Press.
A Preliminary Organic Chemistry. In Preparation.
Some new reactions of sulphur dioxide. Part i with metal oxides. In prep. for *J. C. S.*

Venables, John Frederick. *b.* 17 Jan. 1888. Magd. Coll. School. 𝔈𝔵.; III Physiol. M.B. 1913. Guy's Hospital. *m.* 1914 Helen Cox.

Greene, Barrington Stopford Conyngham. *b.* 8 June, 1888. Eton. Civil Engineer.

Ogilvie, Alan Grant. *b.* 3 July, 1887. Westminster. II Hist. 1909. Librarian and Lecturer, School of Geography, 1912; Albert Kahn Travelling Fellow, 1914; Lieut. 7th London Brigade, R.F.A. Awarded Cuthbert Peek Grant of R. Geographical Society, 1915.

Some recent observations and theories on the Structure and Movement of Glaciers of the Alpine type. *Geogr. Journal*, Sept. 1912.
Morocco and its Future. *Geogr. Journal*, June 1912.
Notes on Moroccan Geography. *Geogr. Journal*, March 1913.
An English Desert. *Geogr. Journal*, June 1913.
The Physical Geography of the Entrance to Inverness Firth. Paper read at *British Association*, Sept. 1913.
Impressions of the Vegetation in the United States of America. Oct. 1913.
Cartographic Needs of Physical Geography. *Geogr. Journal*, Jan. 1915.

Cardwell, Ronald McKenzie. *b.* 9 July, 1887. Clifton. B.A. 1909. Lieut. Sussex Yeomanry.

Parry-Jones, Owen Guy. *b.* 14 June, 1887. Sherborne. Acad. Clerk; B.A. 1910. St. Thomas's Hospital. Lieut. 3rd Res. Batt. Lanc. Fusiliers.

1907.

Somervell, Donald Bradley. *b.* 24 Aug. 1889. Harrow. 𝔇.; II Math. Mods.; I Chem. 1911. Fellow of All Souls College, 1912. Lieut. 9th Batt. Middlesex Regt.

The velocity of reaction between potassium chloro-acetate and some aliphatic amines. [With Moore and Derry.] *J. C. S.* 1912.

Coventry, Alan Freeth. *b.* 23 Sept. 1888. Willaston School. 𝔈𝔵.; II Zool. 1910. Asst. to Linacre Prof., Oxford, 1911; Superintendent of Bute Natural History Museum, Rothesay N.B., 1911; Lecturer in Vertebrate Embryology, Toronto, 1912.

Wilkie, Archibald Hanning. *b.* 1 Sept. 1889. Fettes. 2nd Lieut. K.R.R.C. Mentioned in dispatches.

Strutt, Geoffrey St. John. *b.* 28 Mar. 1889. Winchester. Stock Exchange. *m.* 1912 Sybil, daughter of Sir Walpole Greenwell, Bart. 2nd Lieut. 5th Batt. Essex Regiment.

Barnes, Henry Durell. *b.* 9 Aug. 1888. Tonbridge.

Ray, William. *b.* 19 June, 1883. Adelaide Univ. 1902–7, M.B. and B.S. 1906; Rhodes Scholar; B.Sc. 1909; Philip Walker Student in Pathology, 1910.

Observations on the relationship between the blood-volume and the total amount of Agglutinin recoverable from actively and passively immunised animals. [With Georges Dreyer.] *Journ. of Path. and Bact.* xiii, 1909.

The blood-volume of mammals as determined by experiments on rabbits, guinea-pigs, and mice, and its relationship to the body weight and to the surface area expressed in a formula. [With Dreyer.] *Phil. Trans.* B. cci, pp. 133–60, 1910.

Further experiments upon the blood-volume of mammals and its relation to the surface area of the body. [With Dreyer.] *Phil. Trans.* B. ccii, pp. 191–212, 1911.

The blood-volume of rabbits. [With Dreyer and E. W. A. Walker.] *Journ. of Path. and Bact.* vol. xvii, p. 143, 1912.

The size of the aorta in certain animals and its relation to their body weight. [With Dreyer and E. W. A. Walker.] *Journ. Phys.* vol. xliv, and *Proc. Physiol. Soc.* May 18, 1912.

The relation between the sectional area of the trachea and the body weight in certain animals. [With Dreyer and E. W. A. Walker.]
Journ. Phys. vol. xlv, from *Proc. Physiol. Soc.* June 29, 1912.

The size of the aorta in warm-blooded animals and its relationship to the body weight and to the surface area expressed in a formula. [With Dreyer and E. W. A. Walker.]
P. R. S. B. lxxxvi, 1912.

The size of the trachea in relationship to the weight, the surface area, the blood-volume, and the size of the aorta. [With Dreyer and E. W. A. Walker.] *P. R. S.* B. lxxxvi, 1912.

On the blood-volume of warm-blooded animals; together with an inquiry into the value of some results obtained by the carbon-monoxide method in health and disease. [With Dreyer and E. W. A. Walker.]
Skandinavisches Archiv für Physiologie, Band 28, 1913.

1908.

Harper, Alan Gordon. *b.* 5 Jan. 1889. Dulwich. 𝔇. II Botany, 1912; Demonstrator, Bangor, 1912; to Prof. Somerville, Oxford, Jan. 1913; Temporary Professor at Presidency College, Madras, 1914; Chapman Research Prize, 1914. Trooper in Southern Provinces Mounted Rifles, Motor Cyclist Section, 1914. Lieut. 3rd Batt. (Reserve) R.F.A. 1915.

Defoliation: its Effects upon the Growth and Structure of the Wood of Larix.
Annals of Botany, xxvii, pp. 621–42, 2 pls., Oct. 1913.

Protomorphic Shoots in the genus Pinus.
Quarterly Journal of Forestry, 6 pp., 1 fig., Apr. 1914.

Experiments on Eccentric Growth of Ash. [With Prof. Somerville.] *Q. J. F.*, 11 pp., 1 pl., July 1914.

(Unpubl. 1914) Fusion of Needles in Pinus.
Studies in the Formation of Autumn Wood in Conifers.

Winmill, Thomas Field. *b.* 13 Sept. 1888. East London Tech. School. 𝔈𝔵.; III Math. Mods.; I Chem. 1911; 𝔖𝔢𝔫. 𝔇. 1912; Chapman Research Prize, 1912. Mackinnon Student of Royal Society 1912 for Research in Structural Chemistry. Doncaster Coalowners' Research Lab. 1914–. *m.* 1913 Marjorie, daughter of R. Clarke.

Association of phenols in the liquid condition. [With J. T. Hewitt.] *J. C. S.* 1907.

Arsenic diiodide. *J. C. S.* 1907.

Studies in the azine series. Pt. I. The constitution of safranine. [With J. T. Hewitt.] *J. C. S.* 1909.

The state of amines in aqueous solutions. [With Moore.] *J. C. S.* 1912.

Arsene. *J. C. S.* 1912.

Clemes, Alfred Willis. *b.* Hobart, 4 Sept. 1887. Tasmania Univ. Rhodes Scholar; I Geol. 1910. First place in Cross-Country Running, 1908.

Garton, Arthur Stanley. *b.* 31 Mar. 1889. Eton. B.A. 1911. Varsity VIII, 1909–11.

Cudmore, Milo Massey. *b.* New South Wales, 2 May, 1888. St. Peter's, Adelaide. B.A. 1911. Varsity VIII, 1908–9. Read for Bar. 2nd Lt. R.F.A. Military Cross.

Angas, Ronald Fife. *b.* S. Australia, 29 April, 1889. St. Peter's, Adelaide. B.A. 1911.

1909.

Acland, Lauchlan Henry Dyke. *b.* 15 April, 1889. Bath. III Chem. 1912. Studied in Munich; Analytical Lab. in London, 1914. Corp. 8th (Service) Batt. K.R.R.C.

Ritchie, Archibald Thomas Ayres. *b.* 2 April, 1890. Harrow. 𝔇.; III Zool. 1913. Caporal 3ième Compagnie Bataillon C, 2ième Régiment, Légion Étrangère, 1914. 2nd Lieut. Gren. Guards, 1915. *Wounded*, Sept. 28, 1915. Awarded the Military Cross, for conspicuous gallantry.

Walker, Frederick Clarkson. *b.* 1891. Church Inst. School, Bolton. Math. 𝔇.; aegrot. Physics 1913.

Ball, Percy. *b.* 2 Feb. 1890. Rugby. 𝔈𝔵.; II Chem. 1912. Sudan C.S.

Vernon, William Norman. *b.* 19 April, 1890. Charterhouse. B.A. 1914.

Cavenagh, John Bernard. *b.* 10 July, 1890. Worcester Cath. King's School. II Physiol. 1913.

Hassard, William Algernon. *b.* 30 Jan, 1891. Charterhouse. Commoner, 1909–.

Symon, Oscar Sturt. *b.* S. Australia, 28 Mar. 1891. St. Peter's, Adelaide. Left, in middle of Final Geology Exam. First Class Diploma and Ridley Prize at Roseworthy Agricultural College, and Gold Medallist, R. Agric. and Hort. Soc. S. Australia (Adelaide *Advertiser*, 13 March, 1915).

1910.

Evans, Griffith Ifor. Univ. Coll. Bangor. Acad. Clerk; II Physiol. 1914. Lieut. R.A.M.C.

Sunderland, James. *b.* 1 Feb. 1891. Manchester Grammar School. 𝔈𝔵.; II Physics, 1914.

Goldsworthy, Leonard James. *b.* 12 Dec. 1890. Ripon Grammar School. 𝔈𝔵.; II Chem. 1913. Professor of Chemistry, Victoria College of Science, Nagpur, 1914–.

Resolution of trans-cyclo Pentane-1 : 2-dicarboxylic Acid. [With W. H. Perkin, jun.]

Carboxylic Acids derived from cyclo-Butane, cyclo-Pentane, cyclo-Hexane, and cyclo-Heptane. [With W. H. Perkin, jun.] *J. C. S.* Nov. 1914.

George, Hugh Shaw. *b.* 29 Jan. 1892. Sexey's School, Bruton. 𝔈𝔵.; I Botany, 1913. At Fulda, Germany, 1913; President Junior Scientific Club, 1913. Indian Forest Service, 1915.

Paterson, John Carruthers. *b.* 9 Sept. 1891. Fettes. III Physiol. 1914. Capt. 9th Batt. Liverpool Regiment. *Wounded,* 7 Oct. 1915.

Smyth, Geoffrey Meliss. *b.* 6 July, 1892. Lynam's and Winchester. III Physiol. 1914. Lieut. 6th (Service) Batt. Loyal N. Lancs.

1911.

Chapman, Edward Frederick. *b.* 15 Mar. 1893. Monckton Combe. 𝔇. Studied in Tübingen, 1913. I Chem. 1915. 2nd Lieut. 14th R. Fusiliers, 1915.

Bennett, George. *b.* Batavia, 1892. Sherborne. 𝔇.

Balfour, Isaac Bayley. *b.* 19 Oct. 1889. Son of Prof. I. B. Balfour, late Fellow of Magdalen. Winchester. Lieut. 3rd Batt. R. Scots. *Killed in action,* Aug. 1915.

Thomson, Cater Hyde. *b.* 1893. Harrow. Left, owing to bad health, 1912.

Hodgkinson, Noel Alexander. *b.* 30 Dec. 1891. Rugby. Capt. 3rd Batt. R. Warwicks.

Horsfall, Ewart Douglas. *b.* 24 May, 1893. Eton. O.U. VIII, 1912–14. 2nd Lieut. 9th (Service) Batt. Rifle Brigade; attached to R. Flying Corps. Chevalier of Legion of Honour, Nov. 1915. Temp. Captain, 1916. Military Cross.

1912.

Browne, William Laurence Fraser. *b.* 15 June, 1893. Winchester. Math. 𝔇. 2nd Lieut. R.F.A.

Prevett, Reginald Arthur Charles. *b.* 15 May, 1894. Wyggeston. 𝔇. 2nd Lieut. 5th Batt. Yorks L.I.

Vernon, Herbert Douglas. *b.* 4 Jan. 1893. Charterhouse. 2nd Lieut. 7th Batt. Liverpool Reg.

Bird, Ashley Hinckes. *b.* 22 April, 1893. Westminster. 2nd Lieut. 9th (Service) Batt. Somerset L.I. *Wounded,* Suvla Bay.

Carr, John Lillingston. *b.* Bangalore, 16 May, 1892. St. Lawrence Coll. Lieut. 3rd Batt. R. Berks.

Britten-Jones, Edmund. *b.* S. Australia, 8 Oct. 1888. Adelaide Univ. Rhodes Scholar; I Physiol. 1914. Lieut. R.A.M.C.

1913.

Halsey, Francis William. *b.* 18 June, 1894. Gresham's School, Holt. 𝔇. 4th (Cyclist) Batt. Hants. 2nd Lieut. R.G.A. *Killed in action in France,* 15 Nov. 1915.

Obit. notices in *Oxf. Mag.* and *Gresham,* 18 Dec. 1915.

Rubie, Howard Ernest. *b.* 15 Dec. 1894. R. Masonic School, Bushey. 𝔈𝔵. Works Chemist at Messrs. Chance and Hunt's new works for manufacture of Trinitrotoluol at Oldbury.

Parnell, John Atherton Parnell. *b.* 1 Mar. 1895. Winchester. R.M.C. Sandhurst. 2nd Lieut. Glos. Regt.

Long, William Henry Thorp. *b.* 8 Oct. 1894. Blundell's School. 2nd Lieut. 5th (Service) Batt. Dorsets.

Berners, Geoffrey Hugh. *b.* 20 Nov. 1893. Eton. 2nd Lieut. 3rd Batt. Norfolks.

de Bernière Smith, Lothrop Lewis. *b.* 24 Aug. 1893. Charterhouse. 2nd Lieut. 6th Batt. Rifle Brigade.

Upton, Hon. Henry Augustus George Mountjoy Heneage. *b.* 24 Aug. 1894. Eton. 2nd Lieut. East Kent Yeomanry.

von Mendelssohn-Bartholdy, Hugo Otto Paul Karl Felix. *b.* 3 Aug. 1894. Gymnasium in Potsdam. ? German Army 1914.

Madigan, Cecil Thomas. *b.* S. Australia, 15 Oct. 1889. B.Sc. in Applied Science, Adelaide University. Member of Sir Douglas Mawson's Antarctic Expedition. F.R.G.S. Arctic Medal, 1915. Lieut. 76th Field Co. Royal Engineers. *m.* 20 Aug. 1915 Wynnis, e. da. of T. C. Wollaston, of Sunningfield, Glenelg, S. Australia. *Wounded,* Oct. 1915.

1914.

Gainsborough, Richard (formerly **Ginsburg, Rudolph**). 𝔇. Medical Student.

Hodgson, Francis Herbert. 𝔇. Medical Student. Candidate for R. Flying Corps. Royal Aero Club Certificate, No. 2325, 1916.

Parsons, Eric King. 𝔈𝔵. 2nd Lieut. 9th S. Batt. Rifle Brigade.

Furniss, Arnold Edeson. 𝔈𝔵. 2nd Lieut. 5th Batt. York and Lancaster Reg.

Hopkins, Herbert Oxley. St. Peter's, Adelaide. 2nd Lieut. 7th Batt. King's Liverpool Regt.

Harvey, Robert Alexander. Passed 4th into Royal Navy, obtaining highest marks in Science, 1915. Appt. to *St. Vincent,* '16.

[**Reynaert, Joseph.** Med. Student of Louvain Univ., 1914.]

1915.

Lewthwaite, Raymond. Acad. Clerk. Medical Student. 2nd Lieut.

Windram, Reginald Whitmore. Williams College, Mass., U.S.A.

Read, Dunstan. Magd. Coll. School. 2nd Lieut.

Engleheart, Francis Henry Arnold. Grandson of J. G. D. E., p. 84.

[**Du Trieu de Terdonck, Charles.** Engineering Student of Louvain.]

1916.

Shaw, Walter Reginald Courtenay. Harrow.

Fraser, Henry Douglas Forbes. Malvern College.

REGISTER OF PERSONS (NOT MEMBERS OF MAGDALEN COLLEGE) WHO HAVE WORKED IN THE DAUBENY LABORATORY DURING THE PERIOD 1893–1915.

1893.

Liddell, Henry Andrew. Non-Collegiate, B.A. 1896. Head Master of Wesleyan School, Oxford.

Judge, Thomas. St. John's, I Chem. 1896. Professor of Chemistry at Bangkok.

Phillips, Harry Edward William. Non-Collegiate, II Chem. 1895. B.Sc. Science Master of Boys' High School, Oxford, and Training College for Girls, Banbury Road, Oxford. Vice-Principal Oxford Univ. Day Training College, 1905.

The Electrical Conductivity of Phosphoric Acid. *J. C. S.* 1909.

1894.

Lysons, Nigel Lucius Samuel. Captain, the King's Own (Royal Lancaster Regiment). Adjutant, 1902; Major, 1913.

Fisher, Harold Pearson. Son of W. W. Fisher (p. 112).

1895.

Hartland, Brantford. St. John's, M.A. 1900. Head Master Paignton College, 1903–.

Hughes-Games, Harold James Wynn. 𝕰𝖝. of Worcester, II Math. Mods. 1893; II Chem. 1895. Asst.-Master Royal Naval College, Osborne, 1904–.

Walter, Ralph. New College, III Chem. 1896. In business. 2nd Lieut. Cyclist Batt. Hants Reg.

Young, John William Alexander. New College, II Chem. 1896.

Bevers, Edmund Cecil. St. John's, II Physiol. 1897. Guy's; M.B. 1901; F.R.C.S. 1911; Hon. Asst.-Surgeon Radcliffe Infirmary, Oxford.

Compression of the Median Nerve. *B. M. J.* 1906.
Hydatid Cyst of Neck with Cellulitis caused by Rupture and escape of Hydatid Fluid. *B. M. S.* 1907.
Rare Variety of Femoral Hernia. *B. M. J.* 1909.
Case of Intestinal Obstruction with enormous Distension of the Caecum. *Lancet*, 1906.
Three Cases of Strangulated Hernia with re-section of Intestine. *Antiseptic*, 1907.
Treatment of Acute Intestinal Obstruction. *Pract.* 1910.
Case of Traumatic Myosotis Ossificans with Involvement of Musculo-Spinal Nerve. 1911.
Case of Facic Hypoglossal Anastomosis. *Lancet*, 1913.

Elford, Stanley. St. John's, III Chem. 1898. Head Master Coopers' Co. School, Bow.

Pinching, Charles James. St. John's, III Physiol. 1898; M.B. 1905. Surgeon Gravesend Hospital and Deputy Coroner, Gravesend.

Hastings-Wilson, David Herbert. St. John's, M.A. 1899.

Hoare, Charles Hervey. New College, aegrot. Chem. 1898. In Banking business.

Tyser, Lionel Robert. New College.

Farncombe, Edgar Leonard. St. John's, III Physiol. 1898.

1896.

Carpenter, Henry Cort Harold. Postmaster of Merton, I Chem. 1896. Professor, Manchester School of Technology.

Chaundy, John Henry. M.P.S.

Johnson, Bertie Cecil. St. John's, III Chem. 1898. ? Farming in Canada.

Crum, Walter Erskine. New College, II Chem. 1897. In business, in India.

Bennett, George Lowe. Casberd 𝔈𝔵. St. John's, M.A. 1901. F.C.S.; Curate of St. Saviour, Everton, 1899.

Ryman-Hall, Bertie Ryman. St. John's, B.A. 1896.

Richards, Owen William. Fellow of New College. I Cl. Mod. 1894; II Physiol. 1896. Guy's Hospital, M.B. 1902; M.D. 1905; F.R.C.S. 1905; Surgeon Kasr-el-Ainy Hospital, Cairo; Professor Clin. Surg. Egypt Government School of Medicine; Surgeon Anglo-American Hospital, Gezireh. With I. Y. Hospital, Deelfontein, South Africa, 1900. D.S.O.

Notes on South African Dysentery. *B. M. J.* 1900.
Routine Use of Spinal Anaesthesia. *B. M. J.* 1911.
Growths of the Kidneys and Adrenals. *Guy's Hosp. Rep.* 1905.
Successful Removal of Stone weighing 2 lb. *Lancet*, 1908.
Case of Double Abdominal Hydrocele. *Lancet*, 1908.
Operative Treatment of Bilharziosis of Large Intestine. *Lancet*, 1910.
Egyptian Splenomegaly and its Surgical Treatment. [With Dr. Day.] *Trans. Soc. Trop. Med.* 1912.
Rhinoscleroma. *B. M. J.* 1913.

Richardson, George Beigh. Worcester, B.A. 1896. Shipbuilder.

Blakelock, Lawrence Neville Salts. Queen's, IV Chem. 1899. Curate of Odd-Rode, Cheshire, 1900.

Billinghurst, Walter Binsmead. 𝔖. St. John's, II Chem. 1898. M.B. 1904. In Shanghai, 1914.

Sparrow, Robert Burslem. Lincoln.

Spicer, Edward Clarke. New College, I Geol. 1899. Late Scholar of Trinity College, Melbourne, M.A. 1879; Queensland Mission, 1884–5; Java, 1885–6; Burdett-Coutts Scholar, 1899; Rector of Throwleigh, Devon, 1889–95.

On Sarsen stones in a Clay pit. *Q. J. G. S.* lxi, p. 39, 1905.
[On Clay-with-flints.] *Q. J. G. S.* lxii, pp. 137, 161, 1906.
Solution Valleys in the Glyme Area (Oxon.). *Q. J. G. S.* lxiv, p. 335, 1908.

Scrivenor, John Brooke. Hertford, I Geol. 1899; Burdett-Coutts Scholar, 1899. F.G.S., Memb. Min. Soc.; Awarded grant from Barlow-Jameson Fund of Geol. Soc. 1913; Geologist to Federated Malay States Government.

[Discoverer of an interesting form of Zircon.]
Thomas, *Bunter Pebble Bed.* *Q. J. G. S.* lviii, p. 623, 1902.

The Granite and Greisen of Cligga Head [N. Cornwall]. *Q. J. G. S.* lix, p. 142, 1903.

Notes on the Geology of Patagonia. *Q. J. G. S.* lix, p. 160, 1903.

The Lahat 'Pipe': a description of a Tin Ore Deposit in Perak. *Q. J. G. S.* lxv, p. 382, 1909.

Rocks of Pulau Ubin and Pulau Nanas [Singapore]. *Q. J. G. S.* lxvi, p. 420, 1910.

Tourmaline-Corundum Rocks of Kinta. *Q. J. G. S.* lxvi, p. 435, 1910.

On occurrence of native Copper with Tin Ore in the Fed. Malay States. *Mineral. Mag.* 1910.

Geology and Mining Industries of Ulu Pahang. *Kuala Lumpur*, 1911.

The Gopeng Beds of Kinta (F.M.S.). *Q. J. G. S.* lxviii, p. 140, 1912.

Geological History of the Malay Peninsula. *Q. J. G. S.* lxix, p. 343, 1913.

Smith, George Frederick Darwall. New College, II Cl. Mod. 1894; I Physiol. 1896; St. George's M.B., B.Ch. 1901.

Treatment of Precipitate Labour; Uterine Inertia; Exhaustion and Tonic Contraction; Contracted Pelvis. Articles in *Latham and English*, '*Syst. Treatment*'.

Congenital Abnormality of Genito-urinary Organs. (With A. Lionel H. Smith.) *Lancet*, 1906.

Case of Perithelioma of Uterus. *Obst. Soc. Trans.* 1907.

An unusual solid tumour of Ovary. *Proc. Roy. Soc. Med.* 1909.

Case of Perithelioma of Endometrium. *J. Obst. and Gyn.* 1908.

1897.

Gorst, Henry Sidney; St. John's, I Chem. 1898.

M'Lachlan, John. M.D. Edin.; Queen's, II Chem. 1900.

Applied Anatomy: Surgical, Medical and Operative. Edinb. 1889.

Hydrogen peroxide. 8vo. Bristol, 1904.

Research on Electrical conductivity of Iodic Acid (unpublished).

Elliott, Arthur Abercrombie. Non-Collegiate, B.A. 1897.

Frewin, James Gilbert. Non-Collegiate, I Chem. 1899. H.M. Inspector of Schools, Scotland.

Purnell, George Sykes. Non-Collegiate, IV Chem. 1900. Asst.-Master, County School, Sandown, I.W.

Freeman, Willie Ludford. St. Edmund Hall, III Chem. 1900; F.C.S.

Taylor, Arthur Henry. St. John's, IV Physiol. 1896. Farming at Medley Manor, Oxon.

Barber, Charles Harrison. Non-Collegiate, Shute 𝔖. 1897; I Physiol. 1900. King's Hospital; M.R.C.S., L.R.C.P. 1902. Captain, Indian Medical Service; Army Specialist in Operative Surgery.

Smith, Eric McLeod. Queen's, III Physiol. 1900; M.B. 1905; M.D. 1912. In practice at Brewassina, N.S.W.

1898.

Eling, Thomas Henry James. Non-Collegiate, III Chem. 1899.

Rowlands, David Ellis. 𝔈𝔵. Jesus, IV Phys. 1899. Vicar of Great Wollaston, 1904–13; Marden, 1914–.

Williams, Jeremiah. Jesus, III Chem. 1900. Headmaster County School, Abergele.

Soddy, Frederick. Postmaster of Merton, I Chem. 1899. Lecturer in Physical Chemistry and Radio-activity in the University of Glasgow. Cannizaro Prize of the Accademia dei Lincei. Professor of Chemistry, Aberdeen, 1914–.

Life and Work of Victor Meyer.
Trans. O.U. Jun. Sci. Club, 1898.

The Radio-activity of Thorium Compounds. (With E. Rutherford.) *J.C.S.* lxxxi. 321, 837–860, 1902; *Phil. Mag.* (vi.) iv. 370, 569, 1902.

The Radio-activity of Uranium.
Trans. Chem. Soc. lxxxi. 860–5, 1902.

Experiments in Radio-activity and the Production of Helium from Radium. (With W. Ramsay.)
Proc. Royal Soc. lxxii. 204, 346, 1903.

Evolution of Matter as revealed by the Radio-active Elements. (Wilde Lecture.) *Mem. Lit. Phil. Soc.* Manchester, 1904.

The Production of Radium from Uranium.
Phil. Mag. ix. pp. 768–79, 1905.

The Evolution of the Elements. *Rep. Brit. Ass.* 1907.

Calcium as an Absorbent of Gases for the Production of High Vacua and Spectroscopic Research.
Proc. R. Soc. lxxviii. 429–58, 1907.

The Relation between Uranium and Radium. (With T. Mackenzie.) *Phil. Mag.* xiv. 272–95, 1907.

A Gas generated from Aluminium Electrodes. (With R. v. Hirsch.) *Phil. Mag.* xiv. 779–84, 1907.

Attempts to detect the Production of Helium from the Primary Radio-Elements. *Phil. Mag.* xvi. 513–30, 1908.

The Electric Discharge in Monatomic Gases.
Proc. R. Soc. lxxx. 92–109, 1908.

Die Entstehung von Helium aus Uran und Thor.
Umschau, xiii. 375–8, 1909.

The Rays and Product of Uranium X.
Phil. Mag. (vi) xviii. 858–65, 1909.

The Rays and Product of Uranium X. (II.)
Phil. Mag. xx. 342–5, 1910.

The Y-rays of Uranium and Radium. (With Russell.)
Phil. Mag. (vi) xviii. 620–49, 1909.

Multiple Atomic Disintegration.
Phil. Mag. (vi) xviii. 739, 1909.

The Interpretation of Radium. 274 pp. 8vo, London, 1909.

The Relation between Uranium and Radium.
Phil. Mag. xviii. 846, 1909; xx. 340–2, 1910.

Conduction of Heat through Rarefied Gases. (With A. J. Berry.) *Proc. R. Soc.* lxxxiii, pp. 254–64, 1910.

Essais pour évaluer la période de l'ionium.
Radium, vii. 295–300, 1910. *Le Radium*, viii. 256, 1911.

The Y-rays of Thorium and Actinium. (With A. S. Russell.)
Phil. Mag. xxi. 130–54, 1911.

The Ratio between Uranium and Radium in Minerals. (With Miss R. Pirret.)
Phil. Mag. xx. 345–9; xxi. 652–8, 1910, 1911.

The Chemistry of Mesothorium.
Trans. Chem. Soc. xcix. 72, 1911.

Conduction of Heat through Rarefied Gases. (II.)
Proc. R. Soc. lxxxiv. 576–85, 1911.

The Chemistry of the Radio-Elements.
92 pp. 8vo, London, 1911. Enlarged, with additions, 1915.

The Origin of Radium. *Proc. R. Inst. Gt. Britain*, xx, 1914.

Some Aspects of the Atomic Theory.
Science Progress, Apr. 1915.

McMullen, Alexander Percy. Postmaster of Merton, I Chem. 1898; Brewer at Guinness's, Dublin.

Inman, Harold Mundee. St. John's, IV Physiol. 1901; St. Mary's Hospital. Captain, Indian Medical Service.

Day, William Leigh Maule. Exeter, B.A. 1899. M.B. 1902, M.D. 1906. In practice in Colchester.

Crosfield, George Henry. University, III Physiol. 1901.

Young, Harold Spencer. Balliol, III Chem. 1904. Sci. Master, Wallingford School, 1908–.

Grosvenor, Norman Edward. Brasenose, IV Physiol. 1899.

Baker, Henry Hugh. University, III Physiol. 1900.

Mullins, Arthur Francis. Keble. Secretary to Mr. Beit of Beit, Wertheimer & Co., S. Africa.

Tordoff, Bertram. Casberd ₷. of St. John's, I Physiol. 1902.

Hubble, Harry Oswald. St. Edmund Hall.

Roberts, Jonathan Hugh. Jesus, II Chem. 1901; B.A. Wales. Research work on Tropical Plants for Board of Agriculture, Jamaica, and on Negro and Half-Caste Races. Asst.-Master, Grammar School, Middleton, Lancs., 1912–.

Elford, Bertram. St. John's, aegrotat. Chem. 1902. Private School near Rochester, *c.* 1910.

Elford, Archibald Sefton. St. John's, III Chem. 1902. Inspector of Elementary Schools under the L.C.C.

Henderson, Turner. University, B.A. 1901.

1899.

Allen, Francis Wellwood. Jesus, IV Chem. 1902. †.

Spear, Robert Heron. Jesus, II Chem. 1899; Asst.-Master, Grammar School, Swansea, 1905–.

Tidy, Henry Letheby. New College, II Chem. 1900. President O.U. Jun. Sci. Club. London Hospital. M.B. 1905; M.R.C.P. 1908; M.D. 1911. *m.* Elizabeth, d. of Sir Wm. Ramsay.

Chemical Pathology of Gout.	*Med. Ann.* 1907.
Signs and symptoms of Thoracic Aneurism.	*Pract.* 1909.
Pericarditis with Effusion.	*P. R. Soc. Med.* 1910.
Relation of acute Phosphorus poisoning to Acidosis.	*Lancet,* 1911.
Analysis of Gastric Contents.	*Q. J. Med.* 1911.
Metabolism in Genital Dermatitis.	*Brit. J. Dermat.* 1911.
Myeloid Leukaemia, chronic and acute. [With D. Panton.]	*Lancet,* 1912.
Treatment of Glycosuria.	*Clin. J.* 1913.

Lee, Edward Cornwall. University.

Shelley, Arnold. Keble, B.A. 1899. London Hospital. M.B. '05. In practice at Chatham.

White, Thomas Richard. Non-Collegiate, IV Chem. 1901. Sen. Chemical Master, Roan School, Greenwich, 1901.

White, Robert Murray. Non-Collegiate, matric. 1897. Math. and Physics Master, Grammar School, Plymouth.

Bibby, Robert Gordon. New College, II Chem. 1903. Engaged in Financial Business.

Murray, Ælfric Charles Ruthven. Wadham, IV Chem. 1902. In S. African Civil Service. Now in Holy Orders.

Ping, Lawrence Spencer. Non-Collegiate, II Chem. 1901.

Billings, George Michael. Jesus, matric. 1896. Head Master Public School, Shanghai, China, 1908.

Griffith, William Edward. Non-Collegiate, B.A. 1902.

Pridham, Charles Albert. St. John's, III Chem. 1902. Asst.-Master, Ripon Grammar School.

Davis, John Sidney. Non-Collegiate, III Physics, 1902. Lecturer in Education, Culham College, 1906.

Laboratory Practice.

1900.

Cooper, Jabez Horace. 𝔖. Jesus, I Chem. 1903. F.C.S. Sen. Science Master, Lancing College, Shoreham, Sussex, 1913.

Baker, Sydney Harold. 𝔖. Jesus, II Chem. 1903. Sen. Science Master, Abingdon School; at Charlottenburg, 1903–4.

Naab, Frederick. Non-Collegiate, B.A. 1901; Asst.-Master, City Technical and Day Schools, Oxford.

Collins, Charles Edwin. Lincoln. ? † before taking a degree.

Bott, Arthur Everard Hulton. 𝔈𝔵. Jesus, II Chem. 1903. Asst.-Master Warwick School, 1904–6. Priest-in-ch. Colchester, Alta, 1909. Curate, Upton-on-Severn, 1911–.

Buck, Henry Charles. Non-Collegiate, III Chem. 1903. Schoolmaster.

Moore, Claude. St. Mary Hall, B.A.; Head Master of the Boys' Central School, Oxford.

Seys, Roger C. Magdalen College School, Army Candidate. Lieut. Royal Garrison Artillery, 1905.

Seys, G. William. Magdalen College School, Army Candidate.

Mockridge, Albert James. Hon. M.A. 1908. Head Master of School for Pupil Teachers, Oxford, 1900–8; Head Master Poole Secondary School.

Loxley, Frederick Lionel Keith, of Oxford; Pharmaceutical Chemist. M.P.S.

Monier-Williams, Gordon Wickham. University, I Chem. 1903.

Marshall, Reginald Philip. Keble, III Chem. 1901; Asst.-Master, Royal Naval College, Osborne, 1905.

Scott, John Irwin. Ex. Merton, I Chem. 1901. F.C.S. At Leipzig, 1901–2; Head Master, Grammar School, Kettering.

Cooke, Henry Harwood. New College, II Chem. 1901; Asst.-Master, Fettes, 1903.

Mortimer, Alfred. Ex. Exeter, Chem. 1904; F.C.S. Asst.-Master, Letchworth School, 1912.

1901.

Thomas, William Jones. Jesus, III Chem. 1902; 2nd Master, Pocklington, E. Yorks, 1906.

John, William Alfred. S. Jesus, II Chem. 1904. Chemist to a mine in S. Wales.

Cocks, Reginald Henry. Lincoln, II Chem. 1903; F.C.S. Science Master, Grammar School, Kingston-on-Thames; Head of Chemical Department, Technical Institute, Kingston-on-Thames.

Graham, Richard Percival Devereux. Non-Collegiate, II Chem. (distinction in Mineralogy), 1904. Lab. asst. to Prof. of Mineralogy, Oxford, 1903; Asst.-Professor of Mineralogy, McGill University, Montreal.

Beards, Clifford. 𝔖. Jesus, II Physiol. 1904. Charing Cross Hosp. M.B. 1907; M.R.C.P. 1909. Medical Superintendent City Hosp. Birmingham.

The Stokes-Adams Phenomena. *B. M. J.* 1907.
Family Tendency to Relapse in Scarlet Fever. *Lancet*, 1909.
Aetiology and Diagnosis of German Measles. *Lancet*, 1910.

Morris, Joseph. Non-Collegiate, II Chem. 1903. Science Master, Hawarden County School, 1903.

Coles, Alfred Bertram. Non-Collegiate, II Chem. 1904. Sen. Science Master, Tottenham County School, 1907.

James, Garnet Williams. Jesus, II Chem. 1904. At Metallurgy School, Birmingham. Now in Canada.

Taylor, Reginald Lionel. Hertford, III Phys. 1903; B.Sc. Lond. Asst.-Master, Alleyn's School, Dulwich.

Lambourne, Christopher. Non-Collegiate, III Chem. 1904. Asst.-Master, Municipal Secondary School, Cardiff.

1902.

Bentley, Walter Henry. 𝔈𝔵. Merton, II Chem. 1902. Sen. Science Master, Borough Secondary School, Croydon.

Sadler, Ralph Trego. Non-Collegiate, Shute 𝔖. 1901, III Chem. 1904. In Orders. Incumbent of Battle Harbour, Newfield, 1912; curate of Fort George, B.C. 1914.

Starley, Bertram Allan. Wadham, matric. 1899; M.A. 1906. Asst.-Master, Leighton Hall School, Carnforth, Lancs.

Stote-Fox, Robert. Hertford, IV Chem. 1903.

Adlam, George Henry Joseph. Wadham, I Chem. 1905; City of London School.

The constancy of water of crystallization in hydrated salts. [With H. B. Baker.] *J. C. S.* 1911.

Scott, Robert Watson. Non-Collegiate, Leathersellers' 𝔈𝔵. 1902; III Chem. 1905. Schoolmaster, in Colonies.

Farrands, Harry. Non-Collegiate, II Chem. 1905. Borough Road Training College.

Wright, Thomas Josiah. Non-Collegiate, matric. 1900. B.A.

1903.

Evans, Charles Irwin. St. John's, III Chem. 1903. Head Master, Leighton Park School, Reading, 1910.

Scothern, Albert Edward. Non-Collegiate, III Chem. 1906. Asst.-Master, Bedales, Petersfield, 1909; Association Blue, 1903–5.

Swallow, Luther James. 𝕰𝖝. Lincoln. III Chem. 1905. Barrister in Manchester.

Japp, Darsie Napier. St. John's, matric. 1901.

Benson-Baker, William Henry. University, III Chem. 1906.

Moss, Albert Henry. Non-Collegiate, matric. 1902. B.A. 1906.

Ford, Leonard Talman. Postmaster of Merton, I Chem. 1903.

Micklewright, Harry George Fletcher. Postmaster of Merton, I Chem. 1903. Science Master, Whitgift Grammar School, Croydon, 1904.

Lambert, Bertram. 𝕰𝖝. Merton, I Chem. 1903; University Demonstrator in Chemistry.

Bunsen's Flame Reactions. *Trans. O.U. Jun. Sci. Club*, 1904.

The Wet Oxidation of Metals: i. The Rusting of Iron [With J. C. Thomson]; ii. The Rusting of Iron. *Trans. Chem. Soc.* 1912.

Co-Editor of Fisher's *Class-book of Chemistry.*

An Electrolytic Theory of the Corrosion of Iron. *Trans. Faraday Soc.* 1913.

An Apparatus for the Purification of Mercury by Distillation in a Vacuum. *Chemical News*, Nov. 1913.

The Wet Oxidation of Metals—
Part iii. The Corrosion of Lead. [With H. E. Cullis.]
Part iv. The Question of Passivity. *Trans. Chem. Soc.* 1915.

Simpson, James Charles. Non-Collegiate, matric. 1902. B.A.

Thomas, Robert Edward. Non-Collegiate, II Chem. 1904. Curate of St. John's, Putney, S.W.

Hawtin, Herbert Edwin. Non-Collegiate, II Chem. 1904. Science Master, Berks. County School, Windsor, 1908.

Wheatley, William. Non-Collegiate, II Chem. 1907; F.C.S. Science Master, Preston Grammar School, 1907–9; Grammar School, Blackburn.

Trump, Richard John. Jesus, II Chem. 1905. Asst. in Patents Office.

Kenrick, Kenrick Lloyd. 𝔖. Jesus, II Chem. 1905. Master at Wigan School.

Pinnock, Henry Tremayne. Exeter, I Chem. 1904.

Myles, Charles Derwentwater. Exeter, III Chem. 1904.

Bond, William Frederick. Exeter, III Chem. 1904. House Master, Lancing College. In Orders.

Batchelor, Tremlett Brewer. University, IV Physiol. 1907.

Pearson, Wilfrid John. University, III Chem. 1907.

Zacharias, George Jessel. 𝔖. University, 1902.

Poulton, Edward Palmer. Brackenb. 𝔖. Balliol, II Chem. '5. Son of Prof. Poulton, *Daub. Reg.*, p. 115. Treas. Gold Medal in Med. Guy's; M.B., B.Ch., M.A. 1910; M.R.C.S. '10; M.R.C.P. '11. Radcliffe Travelling 𝔉.; Beit 𝔉., 1914; Proposed research—Respiration and Metabolism in Disease.

Radium. *Trans. O.U. Jun. Sci. Club*, 1904.
Effect of Want of Oxygen on Respiration. *J. Physiol.* 1908.
Influence of High Temperature on Nitrogen Metabolism. *Q. J. Med.* 1912.
Blood Dissociation Curves in Uraemia. [With J. H. Ryffel.] *Proc. Physiol. Soc.* June 1913.
Variation in Uric Acid Excretion with Diet. *Q. J. Med.* 1913.
Alleged Excretion of Creatine in Carbohydrate Starvation. *Proc. R. S.* 1914.
Alveolar CO_2 Pressures in Diabetes. *P. R. S. Med.* 1914.

Hutchinson, William Doge. Balliol, II Chem. '6. Two years at Rothamsted Expt. Station. Botanical and Chemical work at Munich.

Birchenough, Charles. Balliol, II Chem. '5. Lecturer in Education and Master of Method, Sheffield University, 1909–.

History of Elementary Education in England and Wales, 1800–1913.
A Primer of Teaching Practice.

Middleton, Wilfrid Lawson. 𝔖. Trinity, III Chem. '4.

Oldfield, Laurel Cecil Francis. Lincoln, II Chem. '6. Inner Temple. Capt. 12th Rifle Brigade. *Killed* in France, 25 Sept. 1915, aged 31.

The Law of Copyright.

Overy, Charles. 𝕰𝔵. Christ Church, II Chem. '5.

Pearson, Arthur Hearne. Queen's, IV Chem. '5. In business in Oxford.

Hadley, Felix Cyril Timmins. Queen's, matric. 1900. Capt. 8th Batt. R. Welsh Fus. *Wounded* in Dardanelles.

Newcomb, Clive. St. John's, II Chem. '5. M.R.C.S., L.R.C.P. '9; M.B., B.Ch. 1910. Casualty officer, St. Thomas's Hosp. Lieut. Indian Medical Service.

Crisp, George Hugh. Pembroke, M.A. '10; B.Sc. Lond. '9. Head Master, Oldbury School, 1911.

Sladden, Arthur Francis. 𝕾. Jesus, I Chem. '6; I Physiol. '8; M.B., B.Ch., M.A. '10; M.D. 1913. Open Schol. St. Barts.; Burrows and Skynner Prizeman, '10. Editor *St. Bart. Hosp. Journal.*

Medicine in Classical Africa. *St. Bart. Hosp. J.* 1912.

Odgers, Albert Garfield. 𝕾. Jesus, I Chem. '6. Master at Wyggeston School.

Blatchley, Charles Frederick Polwhele. Exeter, II Chem. '5.

Seal, Francis Joseph. St. John's, IV Chem. '4.

Coles, Alfred Bertram. Non-coll., II Chem. '4. F.C.S. Sen. Sci. Master, Tottenham County School, 1907.

Howell, William John. Non-coll., B.A. 1906.

1904 (Michaelmas).

Campbell, Norman Phillips. Brackenb. 𝕾. Balliol, I Chem, '7. In charge of Science Dept., Trinity College, Kandy (C.M.S.).

Solubility of Iodine in Water. [With Hartley.] *J. C. S.* 1908.
The Preparation of Conductivity Water. [With Hartley and Poole.] *J. C. S.* 1908.

Poole, Reginald Holiday. 𝔖. Trinity, I Chem. '7. Demonstrator at Balliol, 1907–8. Sci. Master, Bradfield Coll. 1909.

The Preparation of Conductivity Water. [With Hartley and Campbell.] *J. C. S.* 1908.

Glover, Norman. 𝔖. Trinity, I Chem. '5.

Gibson, Hugh Sumner. Trinity, III Chem. '6.

Kershaw, Henry Owen. 𝔈𝔵. Christ Church, II Chem. '6. Education Department, Government of India.

Johnston, George Douglas. 𝔖. Christ Church, I Chem. '6. Barrister-at-Law.

Nicholas, Sydney Diggary. Lincoln, IV Chem. '7. Asst. Master, Wheelwright Gr. School, Dewsbury, Yorks.

Hess, Arthur Frank. Lincoln, III Chem. '6.

Sykes, William Henry. Queen's, III Chem. '8. Asst. Commissioner, Northern Nigeria.

Birt, Roderick Harold Capper. New Coll. Member Cross-country Running Team, 1902–4. Priest's Orders, '8; F.C.S. Asst. Master at Radley.

Alexander, Thomas James Roland. Lincoln, I Chem. '7; Würzburg, 1909. Nobel's Research Lab., Ardrossan, 1914.

Clarke, Herbert Edmund. 𝔖. Jesus, II Chem. '7. Research Chemist in Lead Works, Newcastle.

Meteorites. *Trans. O.U. Jun. Sci. Club*, 1908.

The Measurement of a Homogeneous Chemical Change in a Gas (the Thermal Decomposition of Ozone). [With Chapman.] *J. C. S.* 1908.

On the Structure and Composition of the Chandakapuo Meteoric Stone. [With Bowman.] *Mineralog. Mag.* 1910.

Clear, Thomas. 𝔈𝔵. Balliol, III Chem. '7. Dep.-Conservator of Forests, Madras, 1914.

Davison, Ronald Conway. Oriel, III Chem. '6.

Thomson, James Campbell. Jesus, II Chem. '7; B.Sc. 1912; Asst. to Dr. H. B. Baker, Ch. Ch.; Asst. Master at Charterhouse. Research with Lambert, q. v.

Vodden, Leonard. Jesus, II Chem. '7.

Nitrogen Chloride. [With Chapman.] *J. C. S.* 1909.

Bullock, Henry Aston Linton. 𝔖. St. John's, B.A. '6.

McMinn, Hugh Bell. 𝔖. St. John's, II Chem. '6. Railway Pupil on Midland Railway.

1905 (Michaelmas).

Mead, Lawrence. Balliol, IV Chem. '6. Barr.-at-Law M. T. '8; Captain's Cert., Cavalry School; Assoc. of Surveyors' Institute.

Editor of *Oke's 'Game Laws'*. 5th edit. 1912.

Barrett, William Henry. Balliol, I Chem. '8. Demonstrator at Balliol Lab. 1908–11; Sen. Sci. Master, Rossall, 1913–.

Wollaston: his Life and Work. *Trans. O.U. Jun. Sci. Club*, 1907.
Sodium Sulphite and its Equilibrium with Water. *J. C. S.* 1909.
The Determination of the Density of Liquids. *J. C. S.* 1911.
Notes on the Determination of the Electrical Conductivity of Solutions. [With Hartley.] *J. C. S.* 1913.

Dodson, Joseph Edward. Balliol, III Math. Mods.; II Chem. '7. Asst. Master at Liverpool College.

1906 (Michaelmas).

Whitley, Charles. Brackenb. 𝔖. Balliol, III Chem. '9.

Merton, Thomas Ralph. Balliol, matric. '6; B.Sc. 1910.

Viscosity and Density of Caesium Nitrate Solutions. *J. C. S.* 1910.
The Absorption Spectra of Permanganates in certain Solvents. *J. C. S.* 1911.
On Changes in certain Absorption Spectra in Different Solvents. *Proc. Roy. Soc.* 1912.
Photography of Absorption Spectra. *J. C. S.* 1913.
Form of Extinction Curves: Cobalt Nitrate. *J. C. S.* 1913.
Absorption of Light by Uranous Chloride in Different Solvents. *J. C. S.* 1913.
Absorption of Gases by Copper. *J. C. S.* 1914.
On a Second Spectrum of Neon. *Proc. Roy. Soc.* 1914.

Guinness, Henry Samuel Howard. Balliol, III Zool. '9. Banker, Hamburg, 1910; Boston, U.S.A., 1911.

Beale, Arthur Hugh Lansdowne. Trinity, matric. '5.

Enfield, Ralph Roscoe. 𝔖. Christ Church, II Chem. '8. Asst. to Prof. of Chemistry (Prof. Pope), Cambridge; Chemist to South London Metr. Gas Company.

Purnell-Edwards, John Purnell. Christ Church, IV Chem. '8.

Wright, Walter William. 𝕾. Pembroke, II Math. Mods.; IV Chem. '8. Math. Master, Municipal Sec. School, Ipswich, 1911.

Venner, Irwin Price. Jesus, II Chem. '8. Bowdon Coll. 1909–12; King's Sch., Grantham, 1914.

Boyd, Gardiner Cust. Lincoln, matric. '4. In Canada.

Boyd, Mossom de Grassi. Lincoln, matric. '4. In Canada.

Hookham, George Richard. Lincoln, matric. '5. Fruit-farming in British Columbia.

Machaya, Manapanda Muttanna. Jun. Indian Student. St. John's, III Geol. '8. Mysore Forest Department.

Ramaiengar, Bindignavale Venkatapathiengar. St. John's, B.A. '7. Mysore Forest Department.

Beaumont, George Ernest. 𝕾. Univ., I Physiol. '10; M.B., B.Ch. '10. Univ. Scholar, Middlesex Hosp. 1910; Theo. Williams Scholar in Pathology, '12.

Diabetes Mellitus. *Middlx. Hosp. J.* 1912.

Geekie, Bernard John. Magd. Coll. School. Dentist. L.D.S., R.C.S. 1911. Of 42 St. Giles's, Oxford.

Russell, John. Balliol, II Chem. '8; F.C.S. Science Master, Central Secondary School, Sheffield, 1908. Asst. Secretary to Education Committee for Oxfordshire, 1915.

Short Stories in *Pearson's Mag.*, *The Teacher*, and *Weekly Telegraph.*

Hutchinson, George Adrian. Balliol, II Chem. '8. † 1912.

Applebey, Malcolm Percival. 𝕾. Trinity, I Chem. '6; B.Sc. Fereday Fellow, St. John's. At Dept. of Explosives Supplies, Ministry of Munitions, 1915.

Chemistry of India Rubber. *Trans. O.U. Jun. Sci. Club.* 1906.

Some Physico-Chemical Properties of Mixtures of Pyridine and Water. [With Garrod-Thomas and Hartley.] *J. C. S.* 1908.

The Viscosity of Salt Solutions. *J. C. S.* 1910.

On the Boiling-Point of Water. [With the Earl of Berkeley.] *P. R. S.* 1911.

On the Boiling-Points of some Saturated Aqueous Solutions. [With ditto.] *P. R. S.* 1911.

The Latent Heat of Vapours; prelim. note. [With D. L. Chapman.] *Proc. Chem. Soc.* 1913.

Willson, Michael. Hunter Blair's Hall, III Chem. '7. In R. C. Orders. Master at Ampleforth College, Malton, Yorks.

King, Cuthbert Witham. Jesus, III Chem. '8. ? at Sec. School, Stockton-on-Tees.

Mason, John Milton. Jesus, matric. '4. No degree.

Reynish, James Bruce. St. John's, II Chem. '8; B.Sc. Lond. Oxf. City Technical Sch.; Gresham's Sch., Holt, 1908–10; Junior Insp. Board of Education, 1910–

Freeborn, Ernest Walter. $. Univ., I Math. Mods. 1895; II Math. 1897. Asst. Master, Harrow.

1906.

Featherstone, Charles Richmond. Lincoln, II Chem. '8. Sen. Sci. Master, K. Edward Gr. School, Aston, Birmingham, 1912–

Garrod-Thomas, Richard Noel. Brackenb. $. Balliol, I Chem. '6; S.M. Harvard, '8; Demonstrator, Balliol Lab. 1906–7; Tutor and Lect. Balliol. 1908–10. Barrister, Inner Temple, 1911.

The Solubility of Triphenylmethane in Organic Liquids with which it forms Crystalline Compounds. [With Hartley.] *J. C. S.* 1906.

The Solubility of Triphenylmethane in Organic Liquids with which it forms Crystalline Compounds. [With Applebey and Hartley.] *J. C. S.* 1908.

Fletcher, Robert James. Queen's, III Chem. '8. Late Asst. Master at Felsted School, Essex.

Robinson, John Hildred. New, IV Chem. '6; M.A.; Priest, '10; Curate of St. Matthew, Westminster, 1909–13; Pr. in charge of Cromarty, Ross-shire, 1913–

Robertson, Philip Wilfred. Rhodes $. Trinity, I Chem. '7. Prof. of Chemistry, Rangoon; Lect. Imperial College of Science.

Rahman, Mohammed Aminar. Jesus, matric. , and only resided for a very short time.

1907.

Pickford, Percival. §. Lincoln, II Chem. '10. Studied at Freiburg i. B.; Sci. Master and Organist, Magd. Coll. Sch., Brackley. Lieut. 4th Batt. Oxf. and Bucks. L. I.

Morris, Arthur Vyvyan. New Coll., IV Chem. '8. Master, Charterhouse.

Carrington, Arthur John Bodman. Univ., IV Chem. '8; M.A. '13. Director of Roughway Paper Mills.

Wheatley, William. Non-coll. Sci. Master at Blackburn Grammar School.

Meadon, Percival Edward. St. John's, IV Chem. '9. Asst. Secretary to Education Committee for Oxfordshire; ditto for Essex, 1915.

Atkin, Robert. Jesus, III Chem. '9; B.Sc. '11. Sci. Master, Southwell Gr. School, 1910.

Wishart, George Illtyd. §. Jesus, III Chem. '9; F.C.S. Master at Alte Burg, Hanover, 1909; Eltham Coll. 1910; Queen's Sch., Basingstoke, '11; Cadet School H.M.S. *Conway*, 1913.

Jones, Herbert Edwin. §. Jesus, II Chem. '9; B.Sc. Lect. Agricultural Chemistry, Bangor.

> The Homogeneous Decomposition of Ozone in the Presence of Oxygen and other Gases. *J. C. S.* 1910.
>
> Decomposition of Dry Ozone. [With Chapman.] *J. C. S.* 1911.

Wills, James Taylor. St. Edmund Hall, II Chem. '8. Asst. Master, Sunderland Bede Collegiate School, 1909.

Phoenix, Alfred Douglas. Jesus, III Chem. '9. ? In Canada.

1907 (Michaelmas).

Wilson, Cyril Charles. Worcester, M.A. 1911. Curate of Sandown, 1911–13; of Ch. Ch., Woking, 1913–.

Ford, Reginald James. Queen's, IV Chem. '9. Sci. Master, St. Bees School, Cumberland. Capt. 17th Batt. Manchester Regt.

Burrell, Charles Milwyn. Univ., III Physiol. '11. Welsh Memorial Prize, 1910. Lond. Hospital.

Sothers, Donald Bevan. 𝕾. St. John's, II Chem. '9. India Forest Service, at Dhulia.

The Solution and Precipitation of Iron, in Iron Pans. [With C. E. T. Morison.] *Jour. Agr. Sci.* vi, Pt. 1, p. 84.

Breakspear, Henry Shaw. 𝕰𝖝. St. John's, III Chem. '9; F.C.S. Second Master, Ludlow Grammar School, 1909.

Mason, Frederick Alfred. 𝕾. and Senior 𝕾. St. John's, I Chem. '9; Ph.D. Munich. Demonstrator Imperial College of Science, London, 1914.

Halogen Derivatives of Malonanilide, Ethyl Maloanilate, and Malonanilic Acid. [With Chattaway.] *J. C. S.* 1910.

Ueber den Einfluss des Lösungsmittels auf Reaktionsgeschwindigkeit und Gleichgewicht. Munich, 1912.

Rose, Ernest Dudley. St. John's, matric. '5.

Fisher, Ernest Arthur. Balliol, I Chem. '11. Lecturer on Agricultural Chemistry, 1911–13, Chief Assist. in Chemical Research Dept. 1913, Wye Agricultural College, Kent.

Doyne, Humphrey Cathair. Trinity, III Chem. '10.

Cumming, Charles Linnaeus. Trinity, I Chem. '10. Research Fellow for Geology in Graduate College, Princeton University.

Rivett, Albert Cherbury David. Rhodes 𝕾. Lincoln, I Chem. '9; B.Sc. '12. Lecturer Melbourne Univ., Organizing Sec. British Assoc., Australia, 1914.

The Rate of Reaction of the Triphenylmethane Dyes with Acid and Alkali. Part III. Diaminotriphenylcarbinol. [With Sidgwick.] *J. C. S.* 1909.

The Rate of Hydration of Acetic Anhydride. [With Sidgwick.] *J. C. S.* 1910.

The Rate of Hydration of Acid Anhydrides; Succinic, Methylsuccinic, Itaconic, Maleic, Citraconic, and Phthalic. [With Sidgwick.] *J. C. S.* 1910.

The Conductivity and Dissociation of Diacetyltartaric Acid. [With Miss Stella Deakin, Univ. of Melbourne.] *J. C. S.* 1912.

Underhill, Lionel Kingsley. See p. 293.

The Interaction of Chlorine and Hydrogen. The Influence of Mass. [With D. L. Chapman.] *J. C. S.* 1913.

1908.

Lacaita, Francis Charles. Balliol, IV Chem. '10. 17th Lancers.

Shaw, William Bayliss. Wadham, II Chem. '9. In business at Walsall.

Salts of 3 : 5-Dinitroquinol. *J. C. S.* 1911.
Salts of the Dinitro-dihydroxy benzenes. *Proc. C. S.* 1911.

Hancock, Ernest. 𝔖. Lincoln, III Chem. '10. Solicitor.

Thompson, Arnold Bosanquet. New Coll., aegrot. Chem. '9. Working for F.I.C. qualification as Analyst in London.

Ballance, Alaric Charles. New Coll., III Chem. '9; M.B. 1914.

Swann, Ernest George. St. Edmund Hall.

Munro, Arthur MacDonald. St. John's, III Chem. '11. Master at Wem Grammar School, 1911–12; Science Master at Technical School, Wellington, New Zealand.

Boyd, Laurence Chadwick. Corpus, II Chem. '8.

Holliday, Skelton. Non-coll. and Jesus, III Chem. '11. Asst. Master, City Technical School, Oxford.

Furneaux, George Pomeroy. Shute 𝔈𝔵. Non-coll., II Chem. '9. Sci. Master, Kingston Grammar School; Head Master of Hastings School of Science, 1915.

Khosla, Lal Chand. Non-coll. Junior Indian Student.

Lindsay, Thomas. 𝔖. Balliol, I Chem. '10. Engaged on the Insurance Commission.

Blackman, Berkeley. Rhodes 𝔖. Queen's, III Chem. '9. ? Teaching in U.S A.

Whitfield, Geoffrey Ernest. New Coll., IV Chem. '9. In a Photographic Plate Co.

Sim, Hermann Alexander Coysgarne. Exeter, B.A. '11. Lieut. 1st Batt. Scottish Rifles (Cameronians). *Wounded,* 1 Jan. 1915.

1908 (Michaelmas).

Wilsdon, Bernard Howell. Lincoln, II Chem. '11. Research with N. V. Sidgwick and Lord Berkeley. Prof. of Chemistry, Government College of Lahore.

The Conductivity and Viscosity of Aqueous Solutions of Anilin Hydrochloride at 25°. *J. C. S.* 1911.
The Solubility of Aniline in aqueous Solutions of its Hydrochloride. [With Pickford.] *J. C. S.* 1911.
Decomposition of Hydrazides and Hydrazones by Heat. [With C. L. Cumming and Chattaway.] *J. C. S.* 1911.
The Rate of Hydration of Acid Anhydrides: Acetic, Propionic, Butyric, and Benzoic. [With Sidgwick.] *J. C. S.* 1913.

Heald, Sydney Joseph. Lincoln, III Chem. '11. In Holy Orders.

Nelson, Thomas Sydney. Univ., II Physiol. '12. At the Front, 1915.

Poulton-Palmer, Ronald William. 𝔈𝔵. Balliol, II Engineering, '11. Capt. Internat. Rugby Team, 1914. Firm of Messrs. Huntley and Palmer, Reading. Lieut. R. Berks. *Killed in action*, 4 May, 1915.

Bourdillon, Robert Benedict. Balliol, I Chem. '12; Fellow and Praelector in Chemistry, University Coll. '13.

Theory of Indicators. *Trans. O.U. Jun. Sci. Club*, 1912.
The Neutral and Acid Oxalates of Potassium. [With Hartley, Drugman, and Vlieland.] *J. C. S.* 1913.

Vlieland, Charles Archibald. 𝔖. Balliol, I Chem. '11.

Research, *see* Bourdillon, R.

Hamlyn, George Anthony. 𝔖. Trinity, II Chem. '11.

Baxter, Robert Reginald. 𝔖. St. John's, III Chem. '12. In Laboratory of Burroughs Wellcome & Co.

The Action of Nitrogen Iodide on Methyl Ketones. [With W. D. Chattaway.] *J. C. S.* 1913.
Research on Derivation of Halogen substituted Sulphon-amides.

Derry, John. Newton 𝔈𝔵. St. John's, II Chem. '11. With the Synthetic Products Co.; Chemist to Hopkins and Williams.

The Velocity of Reaction between Potassium Chloroacetate and some Aliphatic Amines. [With Moore.] *J. C. S.* 1912.

Berlein, Charles Mauritz. New Coll., III Chem. '10. With Anglo-Burma Oil Co. Lieut. 5th Batt. Oxf. and Bucks. *Killed in action*, 1915.

Bourne, Robert Croft. New Coll., B.A. '11. Stroke of O.U. VIII, 19–. Reading for Bar.

Pery, Hon. Edmund Colquhoun. New Coll.

1909.

Bury, Charles Rugeley. Trinity, I Chem. '11; B.Sc.

Webb, George Ernest. Non-coll., IV Chem. '9. In a Siamese Government School, near Bangkok.

Dell, Reginald. Non-coll., IV Chem. '9. Science Master, Chigwell School, Essex.

1909 (Michaelmas).

Olmsted, James Montrose Duncan. Rhodes 𝔖. Queen's, III Chem. '11. Dep. Prof. Richmond College, Va., U.S.A.

The Action of Aromatic Amines on Ethyl Malonate. [With Chattaway.] *J. C. S.* 1910.

Lambert, William James. 𝔖. Queen's, I Chem. '12. Indian Forest Service.

Has prepared a thesis for the B.Sc. on Polymorphous modifications of Anilides and Hydrazides.

Haeffner, Wilfrid. New Coll., III Chem. '11. Engaged in Colour Works.

Parsons, Nigel Montgomerie. New Coll., III Chem. '11. Chemist with Messrs. Strange and Graham. (Synthetic Rubber.)

Swinton, Alan Edulf. New Coll., III Chem. '12. Interested in Agricultural Research.

Weather Forecasting. *Trans. O.U. Jun. Sci. Club.* 1912.
N-chloro-Derivatives of Benzylidene-Diamides. [With Chattaway.] *J. C. S.* 1912.

Cowie, Graham Robertson. Univ., III Physiol. '13. Welsh Memorial Prize, 1911. At Middlesex Hospital.

1910.

Vipan, Geoffrey. St. John's, IV Chem. '13,

Forrester, George Douglas. Univ., IV Physiol. '13. In business in Burmah.

Pierce, Harold Wynn. 𝕾. Lincoln, III Chem. '12. *Died* in Uganda.

Tunbridge, William Stephen. Lincoln, IV Physiol. '12.

Gloyne, George Blakiston. Wadham, IV Chem. '11. With a trading company in Batavia, Java, 1914.

Manley, Cyril Hubert. Bracegirdle 𝕰𝔵. Non-coll., II Chem. '13. Son of J. J. Manley, *Daub. Reg.*, p. 130. Assistant to Oxford County Analyst, 1914–15. Works Chemist at Messrs. Chance and Hunt, Govt. Dep., Oldbury, near Birmingham. New works 1915.

Drury, Vyvyan Drue. *b.* 13 Feb. '93. Of Eton College until 1910. 2nd Lieut. County of London Yeomanry (T.F.). *Wounded,*

Aldridge, Montague. Shute 𝕰𝔵. Non-coll., III Chem. '12.

The Auto-reduction of Hydrazines. [With Chattaway.]
J. C. S. 1911.

Constable, Alfred Bertie. Non-coll., III Chem. '12; B.Sc. Assistant to Oxford County Analyst (W. Fisher), 1912–13. Science Master, Bromley, Kent.

Derivatives of P-iodo Aniline. [With Chattaway.]
Proc. Chem. Soc. 1913.

1910 (Michaelmas).

Hamilton, Charles Keith Johnstone. Lincoln, III Chem. '13. Medical Student.

Gillbert, John Guy. 𝕾. Lincoln, II Chem. '12. Asst. to H. B. Baker. Chemist with Brunner, Mond & Co.

Coghlan, William Humphrey. Univ., matric. '9, †.

Tinne, Christopher Edward. Univ., III Chem. '14. 2nd Lieut. I.A. Reserve Brigade R.F.A.

Womersley, Leonard Dale. Univ., IV Chem. '13.

Osborne, Ernest Thomas. Radcliffe 𝕾. Univ., II Chem. '13. Engaged in Research on Derivatives of Butyl Alcohol with Prof. Perkin.

Cory-Wright, Geoffrey. Univ., matric. '10.

Donald, Graham. 𝔈𝔵. Univ., IV Physiol. '14. Assistant Surgeon on a Torpedo-Boat, 1914.

Greenshields, William Rose. Univ., III Physiol. '14. Welsh Memorial Prize, 1913.

Greenwood, Maurice. Trin., II Chem. '12.

Downes, Villiers. Trin., matric. '09.

Scholfield, Wilfrid Stanley. Balliol, 1909–11. Now in British Columbia.

Johnston, Geoffrey Stewart. New Coll., IV Chem. '11. In business in S. America. Lieut. Essex Yeomanry. *Killed in action* in France, May 13, 1915.

Berisford, Edwin Aris. Holwell 𝔈𝔵. Queen's, II Chem. '13. Capt. 9th (Serv.) Batt. W. Yorks. Engaged in Research on Poison Gas, 1915.

Lucas, Gilbert William. Rhodes 𝔖. St. John's, III Chem. '13. Unfinished Research with Prof. Perkin on Alkaloids. ? Holding some post in S. African College.

Bomford, Alan Claud. St. John's, matric. '10, III Chem. '13.

Bassett-Smith, Dudley William. St. John's, IV Chem. '12. Schoolmaster.

Crane, Reginald Hooper. 𝔈𝔵. Keble, III Chem. '11; B.Sc. 1914.

1911 (Lent).

Kingstone, Wesley Herbert. Non-coll. and Pembroke, matric. '9.

Ainsworth, William Thomas Taylor. Shute 𝔈𝔵. Non-coll., IV Chem. '11. Post in Egypt.

Freeman, Alston Berkeley. St. John's, III Chem. '13.

Freeman, Tristram. St. John's, B.A. '14. 2nd Lieut. Worcestershire Regt. *Killed in action*, March 12, 1915.

Tesh, William. Queen's, II Chem. '13. Signalling Instructor. Flight Sub-Lieut. R. Naval Air Service, 1915.

Research on Isomeric Hydrazides [with Chattaway] (in progress).

Munro, Leslie Alexander. Somerset 𝔖. B.N.C., III Chem. '13. Chemist with Brunner, Mond & Co.

Wyley, William Reginald FitzThomas. Balliol, matric. '10. 2nd Lieut. 3rd Batt. Argyll and Sutherland Highlanders.

1911 (Michaelmas).

Atkinson, Harold. . St. John's, II Chem. '14.

Thomas, Arthur Ernest. 𝔖. Univ. '11.

Hunter, Hugh Michael. Univ., matric. '11. 2nd Lieut. 3rd Batt. Wilts. Regt. *Died of wounds* after Neuve-Chapelle, April 6, 1915.

Spurrell, William James. 𝔖. Lincoln, 1911. 2nd Lieut. 9th (Service) Batt. Norfolk Regt.

Kewley, John Tasker. 𝔖. B.N.C., II Chem. et Cryst.* (dist.) '14. 2nd Lieut. 6th (Service) Batt. Loyal N. Lancs. Regt.

Shardlow, John Ambrose. Keble, III Chem. '12.

Hodgkin, Adrian Eliot. 𝔖. Keble, II Chem. '12. Chemist with Brunner, Mond & Co.

Facer, Albert William. Hughes 𝔖. Oriel, II Chem. '14; O.T.C. Research with Prof. Perkin on action of Chlorine on Butylene.

Goolden, Richard Owen. Queen's, matric. '10. 2nd Lieut. 3rd Batt. Bedfords.

Stuart, John McArthur. Balliol. ? Research with Hartley.

1912 (Lent).

Walters, David John. B.N.C., II Chem. '14.

Flowers, Charles Reginald. 𝔖. Lincoln, 1912. Interned in Austria, 1914.

Skinner, Douglas Hilton. Univ. 2nd Lieut. 7th (Service) Batt. R. W. Kent Regt.

Barnard, Eric. Univ., I Physiol. '14. 2nd Lieut. 7th (Service) Batt. Gloucestershire Regt.

Thompson, Morice Bell. St. John's. 2nd Lieut. 8th (Service) Batt. R. Berks. Regt.

Barley, Leslie John. Southampton 𝔈𝔵. Queen's, II Chem. '14. Capt. Dept.-Asst. Adj. Gen. Engaged in Research on Poison Gas, 1915.

Wise, Henry Dacres. Oriel, matric. '10.

Chari, Perungavur Raghava. Junior Indian Student. Non-coll., IV Chem. '13.

Gilson, Van Wagenen. Rhodes 𝔖. Queen's, '11.

Wright, Claude de Vire. Univ., matric. '10.

Tuke, Arthur Harrington Seymour. Univ., IV Physiol. '14. 2nd Lieut. 2nd Batt. Northumberland Fusiliers. † *in action*, May 9, 1915, near Ypres.

Wright, Samuel King. Lincoln, II Physiol. '14. Lieut. 8th Batt. W. Riding Regt. *Killed in action*, Dardanelles, 27 Aug. 1915.

Webster, Francis. New Coll., matric. '10.

Rosling, Alfred. St. John's. 2nd Lieut. Suffolk Yeomanry.

1912 (Michaelmas).

Shaw, Edward Alfred. B.N.C., matric. '11. 2nd Lieut. 6th (Service) Batt. Oxf. and Bucks. Lt. Inf.

Harris, Hinton John. Hastings 𝔈𝔵. Queen's. 2nd Lieut. 5th Batt. Hants Regt.

Bowlby, Hugh Salvin. Balliol, matric. '11. 2nd Lieut. 7th (Service) Batt. Royal Sussex Regt.

Godson, Claude Lionel. Trinity, matric. '11. 2nd Lieut. Infantry.

Tribe, Maurice Odell. St. John's. Serving.

Jerman, Reginald Herbert. St. John's. Lieut. 1st Batt. Royal Welsh Fusiliers (promoted from Motor Cyclist, R.E.).

Hirst, Thomas William. St. John's. 2nd Lieut. Yorks. Dragoons.

de Jongh, Louis Anthony. Univ., matric. '12.

Williams, Thomas Wodehouse. Oriel, matric. '12. 2nd Lieut. 3rd Batt. Northants Regt. *Killed in action*, May 1915

Davies, Thomas Ellis. 𝔖. Lincoln, 1912.

Aldous, Wilfrid Major. 𝕾. Lincoln, 1912. 4th Batt. Oxf. and Bucks. Lt. Inf.

Jarintzoff, Dimitri. Postmaster, Merton, II Chem. '13.

1913.

Potts, Henry. Radcliffe 𝕾. Univ. '13.

Booker, Hubert Gerald. St. John's.

Beard, Edmund Charles. B.N.C., matric. '12. 2nd Lieut. 5th (Service) Batt. Royal Irish Regt.

Willans, Peter William. Math. 𝕾. Hertford.

Ellington, Oscar Charles. Neale 𝕾. Oriel, '13.

Sharpe, Frank. Non-coll., matric. 1912.

1913 (Michaelmas).

Kendrick, Thomas Downing. Oriel, matric. '13. 2nd Lieut. City of Birmingham Batt. Royal Warwicks. Regt.

Barry, Arthur Gordon. Oriel, matric. '13. 2nd Lieut. New Army.

Colbourne, Maurice Dale. 𝕰𝖝. Oriel, '13. 2nd Lieut. 3rd Batt. Royal Berks. Regt.

Lawson, Digby Richard. 𝕾. Univ., matric. '13.

Maggs, Eric William Bristowe. Univ., matric. '13.

Loxton, Charles Edward Holden. Univ., matric. '11. 2nd Lieut. 5th Batt. N. Staffs. Regt.

Harold, John Peter Bevan. Univ., matric. '12. 2nd Lieut. R.F.A.

Clapperton, Robert Henderson. Univ., matric. '12. 2nd Lieut. 5th Batt. Devons. Regt.

Hodgson, George Dufour. Hastings 𝕰𝖝. Queen's, '13.

Hathaway, Thomas William. Non-coll., matric. '12.

Taylor, Thomas Weston Johns. 𝕾. B.N.C. '13. Public Schools Batt. Middlx. Regt.

Bown, Arthur Mervyn. Millard 𝕾. Trin., matric. '12. 2nd Lieut. 7th London Brigade, R.F.A.

Stephens, Frederick Dorsey. Rhodes 𝕾. St. John's.

Powell, Robert Keal. St. John's. 2nd Lieut. 11th (Service) Batt. N. Staffs. Regt.

1914.

McCance, Henry Bristow. Jodrell 𝔖. Queen's.

Sinclair, Thomas Spark. B.N.C., matric. '11.

Ferard, Cecil Leonard. Univ., matric. '13. King Edward's Horse.

Horsley, Siward Myles. St. John's. 28th Batt. London Regt. (Artists' Rifles).

Vines, H. W. C., son of Prof. S. H. Vines. 𝔖. Christ's Coll. Cambridge, B.A. Camb. '14.

Christison, Frederick John. Univ., matric. '13. 2nd Lieut. 10th (Service) Batt. Argyll and Suth. Highlanders.

Donne, Arthur Courtenay. Univ., matric. '12. 28th Batt. London Regt. (Artists' Rifles).

White, Reginald Strelley Moresby. Heath Harrison 𝔈𝔵. B.N.C., '12. 2nd Lieut. 8th (Service) Batt. Leicestershire Regt.

Sutcliffe, Ronald. Bracegirdle 𝔈𝔵. Non-coll., matric. 1913. Earl of Durham's Battalion.

1914 (Michaelmas).

Panday, Piroshaw. Lincoln, matric. '13.

Collins, Oliver Charles. 𝔈𝔵. Lincoln, '14.

Stansbie, Edward Hounslow. 𝔖. Lincoln, '14.

Shepperd, Charles Bertram. Queen's, matric. '14.

Cowan, John Macqueen. Univ., matric. '14.

Sherrington, Charles Ely Rose, son of Prof. Sherrington, Fellow. Shrewsbury School. 2nd Lieut. 3rd–4th Batt. Oxford and Bucks L.I.

1915.

Alden, John Wenham. Worcester.

Boone, William Brooke. Lincoln.

Codd, Laurence William. Univ.

Wace, Henry. King's School, Canterbury.

Harrison, John Malthouse. Hon. 𝔖. Queen's.

Hoskings, Arthur Austin. Keble.

Drescher, Hugh Albert Edward. 𝔈𝔵. Queen's.

Hardy, John King, son of W. B. Hardy, F.R.S.

Johnston, James W.

Purdy, James Knowles. Lincoln.

Dixon, Percy Embleton. Queen's.

Leggatt, Donald Hugh Murray. Charterhouse School. Preparation for Woolwich.

1916.

Thomas, Moyer Delwyn. ℜ. Lincoln.

Carleton, Harry M. New College. (Zoology.)

List of Boys from Magdalen College School who have attended Mr. Manley's Courses in the Daubeny Laboratory.

1907.

Sells, Clement Peronnet. 𝔈𝔵. Merton, III Physiol. '12.

Underhill, Lionel Kingsley. 𝔈𝔵. Jesus, II Chem. '11. In a Missionary School in China.

Page, George Foster Braithwaite. M.B., B.Ch. Edinburgh. Royal Navy.

Pilcher, Keith Ritchie. 𝔖. Univ., II Chem. '13. Science Master, Kingston Grammar School, Jamaica.

Manley, C. H. See p. 286.

Cooke, Clement. Arts 𝔖. St. Thomas's Hospital.

Palin, Alan C. S.

1909.

McIntyre, Kenneth.

Canton, Herbert W.

Thomson, Graham G. Passed Interm. Sci. Exam. London, 1913.

Grundy, G. Leslie O. With Vickers, Maxim & Co. 2nd Lieut. Yorks. and Lancs. Regt.

Clapperton, Robert Henderson. Univ. Coll., matric. '12.

1910.

Drew, Arnold. 2nd Lieut.

Bell, Hugh Chester. Jesus, matric. '13. 2nd Lieut. Kitchener's Army.

Gwilliam, Stephen.

Morgan, B. E.

Wilkinson, Frank D. In a London office.

1911.

Hoey, John Trevor Stevenson. Jesus, matric. '11. R.A.M.C.

Clarke-Turner, Frank. Sidney Sussex, Camb., matric. '12.

Christie, Robert C. Royal Engineers.

Bradley, Horace F. In Canada.

1912.

Boyer, George Walker Basil. Adm. at Downing, Camb. Schoolmaster at Skegness.

Robertson, William Parret. Wadham.

Simmonds, Gerald. In Eastern Telegraph Co.'s service.

Attwood, Carden. Science student in London.

Scattergood, Thomas Anthony. St. John's, matric. '13. R.A.M.C.

Bickerton, Gerald T. F. Engineering. Hants Regt. Cycle Corps.

1913.

Rolls, Charles W. Schoolmaster.

Amon, Horace. In London, County, and Westminster Bank.

Martin, Geoffrey N. In a London office.

Shepperd, Charles Bertram. Queen's, matric. '14.

1914.

Beasley, Bernard Radbone. Passed into Civil Service (Intermediate).

Burt, Henry J. American citizen.

Abu Bakar Bin Ibrahim, Prince.

Jacks, Graham.

Slater, Owen Richard.

Read, Hugh Stanley Hely.

1915.

Ahamed, Bin Ibrahim.

Deglatigny, Pierre Octave Médéric.

LIST OF BELGIAN BOYS ADMITTED TO LECTURES DURING THE GERMAN OCCUPATION OF BELGIUM.

1915.

With Monsieur **Locus**:

Cundde, Marcel. Antwerp.
Dufraing, Léon. Antwerp.
Claeys, Gaston. Ghent.
Hertoghe, Pieter. Antwerp.
Liesens, Antoine. Ramines.
Steenhout, Fernand. Ghent.
De Smet, M. Bruxelles.
Belpaire, André. Antwerp.
Thoné, Albert. Haelen (Diest).
Van Meerbeeck, Maurice. Malines (Antwerp).

1916.

Devaux, Maurice. Antwerp.
De Jonghe, Jules. Haasdonk.
Dufraing, Charles. Antwerp.
Lyssens, Léon. Thisselt.
Liesens, Michel. Ramines.
Thoné, Léon. Haelen (Diest).

List of recently printed works relating to Magdalen College.

A History of the Daubeny Laboratory. With portrait of Dr. Daubeny and two plates. 8vo. 5*s*.

(*A few copies were issued with some Additional Papers, or reprints of scientific reports, bound at the end of the volume.*)

Oxford Gardens, based upon Daubeny's Popular Guide to the Physick Garden of Oxford: with notes on the Gardens of the Colleges and on the University Park. Price 6*s*.

A Register of the Members of St. Mary Magdalen College, Oxford. New Series. Fellows. In 8 volumes. By W. D. Macray. Price £2 10*s*.

A Description of the Brasses and other Funeral Monuments in the Chapel of Magdalen College. With 17 illustrations. Price 2*s*. 6*d*.

(The above-mentioned books can be obtained on application at the *Bursary, Magdalen College*, or at the *Daubeny Laboratory, Magdalen College, Oxford.*)

A Cartulary of the Hospital of St. John the Baptist. Vols. I and II, price 10*s*. 6*d*. each. Vol. III in preparation. Published by Humphrey Milford, Oxford University Press.

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Author Gunther, Robert Theodore
Title The Daubeny Laboratory Register, 1904-1915.

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